STATE OF CALIFORNIA
The Resources Agency

Department of Water Resources

BULLETIN No. 91-21

WATER WELLS AND SPRINGS IN IVANPAH VALLEY

SAN BERNARDINO COUNTY CALIFORNIA

Prepared by
United States Department of Interior
Geological Survey

FEDERAL-STATE COOPERATIVE GROUND WATER INVESTIGATIONS

JANUARY 1972

NORMAN B. LIVERMORE, JR.	RONALD REAGAN	WILLIAM R. GIANELLI
Secretary for Resources	*Governor*	*Director*
The Resources Agency	State of California	Department of Water Resources

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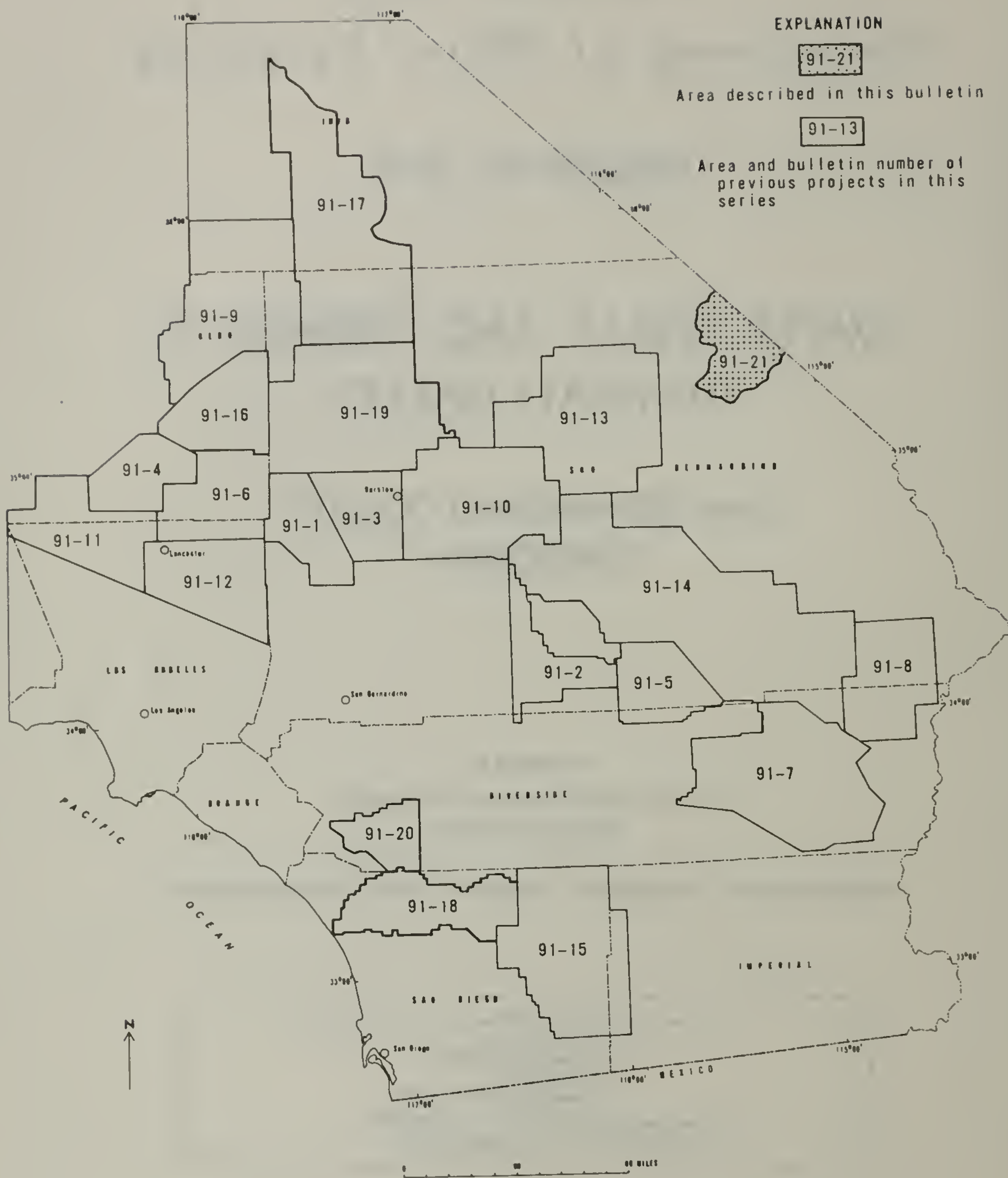


PART OF SOUTHERN CALIFORNIA SHOWING AREA DESCRIBED IN THIS AND PREVIOUS BULLETINS OF THE NO. 91 SERIES

This bulletin is one of a series on water wells and springs in southern California desert areas. The series is prepared by the U.S. Geological Survey and published by the California Department of Water Resources.

Each bulletin shows location of water wells and springs in a part of the southern California desert regions; describes well depth and yield, water use and level on dates observed; names the well owner; provides pumping data, including depths, rates, static water levels, drawdowns, and specific capacities; and lithologic data from drillers' well logs.

Earlier bulletins in the series are:

Bulletin No. 91-1: Data on Wells in the West Part of the Middle Mojave Valley Area, San Bernardino County, California. June 1960; 126 p. [Out of print]

91-2: Data on Water Wells and Springs in the Yucca Valley-Twentynine Palms Area, San Bernardino and Riverside Counties, California. June 1960; 164 p. [Out of print]

91-3: Data on Water Wells in the Eastern Part of the Middle Mojave Valley Area, San Bernardino County, California. August 1960; 223 p. [Out of print]

91-4: Data on Water Wells in the Willow Springs, Gloster, and Chaffee Areas, Kern County, California. September 1960; 90 p. [$1.50 a copy]

91-5: Data on Water Wells in the Dale Valley Area, San Bernardino and Riverside Counties, California. March 1961; 60 p. [$1.50 a copy]

91-6: Data on Wells in the Edwards Air Force Base Area, California. June 1962; 212 p. [$3.00 a copy]

91-7: Data on Water Wells and Springs in the Chuckwalla Valley Area, Riverside County, California. May 1963; 78 p. [Out of print]

91-8: Data on Water Wells and Springs in the Rice and Vidal Valley Areas, Riverside and San Bernardino Counties, California. May 1963; 36 p. [Out of print]

91-9: Data on Water Wells in Indian Wells Valley Area, Inyo, Kern, and San Bernardino Counties, California. May 1963; 246 p. [$4.00 a copy]

91-10: Data on Wells and Springs in the Lower Mojave Valley Area, San Bernardino County, California. December 1963; 212 p. [$3.00 a copy]

91-11: Data on Water Wells in the Western Part of the Antelope Valley Area, Los Angeles and Kern Counties, California. May 1965; 278 p. [$1.50 a copy]

91-12: Data on Water Wells in the Eastern Part of the Antelope Valley Area, Los Angeles County, California. December 1966; 448 p. [$4.75 a copy]

91-13: Water Wells and Springs in Soda, Silver, and Cronise Valleys, San Bernardino County, California. August 1967; 80 p. [$1.00 a copy]

91-14: Water Wells and Springs in Bristol, Broadwell, Cadiz, Danby, and Lavic Valleys and Vicinity, San Bernardino and Riverside Counties, California. August 1967; 80 p. [$1.50 a copy]

91-15: Water Wells and Springs in Borrego, Carrizo, and San Felipe Valley Areas, San Diego and Imperial Counties, California. January 1968; 142 p. [$2.00 a copy]

91-16: Water Wells and Springs in the Fremont Valley Area, Kern County, California. February 1969; 158 p. [$2.00 a copy]

91-17: Water Wells and Springs in the Panamint, Searles, and Knob Valleys, San Bernardino and Inyo Counties, California. December 1969; 110 p. [$2.00 a copy]

91-18: Water Wells in the San Luis Rey River Valley Area, San Diego County, California.

91-19: Water Wells in the Harper, Superior, and Cuddeback Areas, San Bernardino County, California.

91-20: Water Wells and Springs in the Western Part of the Upper Santa Margarita River Watershed, Riverside and San Diego Counties, California.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Water Resources Division
District Office
855 Oak Grove Avenue
Menlo Park, California 94025

September 3, 1971

Mr. William R. Gianelli, Director
Department of Water Resources
State of California--Resources Agency
Post Office Box 388
Sacramento, California 95802

Dear Mr. Gianelli:

We are pleased to enclose, for publication by the Department of Water Resources, the U.S. Geological Survey report on "Water Wells and Springs in Ivanpah Valley, San Bernardino County, California," by W. R. Moyle, Jr.

This report--one of a series on the desert region of southern California--was prepared by our Garden Grove subdistrict office, in accordance with the cooperative agreement between the State of California and the U.S. Geological Survey. It tabulates all available data on wells and springs in the indicated area and contains maps showing the location of wells and springs and the reconnaissance geology with special reference to the water-yielding deposits.

Very truly yours,

R. Stanley Lord

R. Stanley Lord
District Chief

FOREWORD

Previous Investigations and Acknowledgments

Data on ground water in Ivanpah Valley are contained in U.S. Geological Survey water-supply papers, professional papers, and open-file reports: Waring (1915 and 1921), Mendenhall (1909), and Thompson (1921 and 1929). The data are included in the tables in this bulletin, as is information supplied by the California Department of Water Resources (1958, 1960-63, and 1966), the Nevada Division of Water Resources (Glancy, 1968), the Molybdenum Corp. of America, and the Vanderbilt Mines operated by Heavy Metals Technology Corp.

The geology, shown in this bulletin, is generalized after Hewett (1956), Sharp and Pray (1952), Olson and others (1954), and Clary (1967), and after an unpublished map by Heavy Metals Technology Corp. (written commun., 1969).

The cooperation and assistance given by the mine operators, railroad companies, highway departments, well owners, and others who contributed materially to the completeness of the data presented in this bulletin are gratefully acknowledged.

Purpose and Scope of the Investigation

The data in this bulletin were collected by the U.S. Geological Survey, in cooperation with the California Department of Water Resources, as a phase of the investigation of water wells and springs and of general hydrologic conditions throughout much of the desert region of southern California.

The general objective of the investigation is to collect and tabulate available ground-water data for the individual desert basins to provide public agencies and the general public with data for an overall ground-water investigation of the area and for planning water utilization and developmental work.

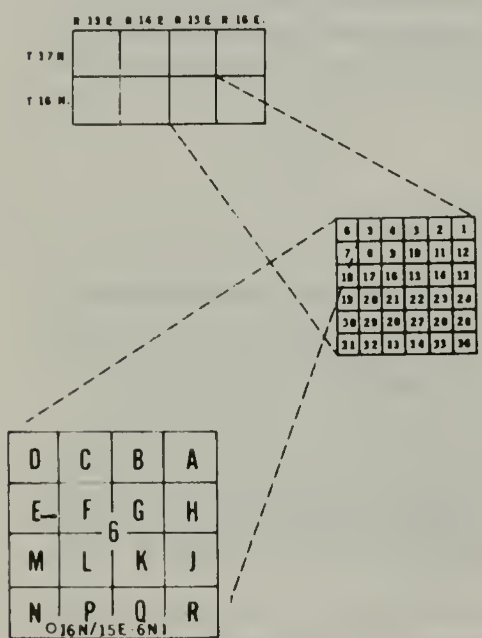
The scope of the work includes (1) brief reconnaissance of major geologic features to determine the extent and general character of the deposits that contain ground water; (2) field examination of most water wells and springs in the area to determine their location with respect to the geographic and cultural features and the public-land net and to record well depths and sizes, types and capacities of pumping equipment, uses of the water, and other pertinent information available at the well site; (3) measurement of the depth to water below land surface; (4) selection of representative wells to be measured periodically to detect and record changes of water level; and (5) collection and tabulation of well and spring records, including well logs, water-level measurements, chemical analyses, and pumping-test data.

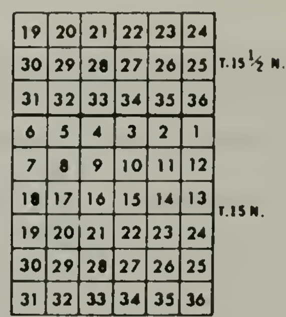
The work was done in 1969 and 1970 by the Water Resources Division of the Geological Survey, under the general supervision of R. Stanley Lord, district chief for California, and under the immediate supervision of James L. Cook, chief of the Garden Grove subdistrict.

Well- and Spring-Numbering System

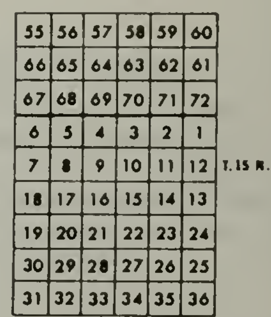
Wells and springs are numbered according to their location in the rectangular system for the subdivision of public land. For example, in the number 16N/15E-6N1, the part of the number preceding the slash indicates the township (T. 16 N.), the part between the slash and the hyphen indicates the range (R. 15 E.), the number between the hyphen and the letter indicates the section (sec. 6), and the letter indicates the 40-acre subdivision of the section. Within the 40-acre tract wells are numbered serially, as indicated by the final digit. Thus, well 16N/15E-6N1 is the first well to be listed in the SW¼SW¼ sec. 6, T. 16 N., R. 15 E., San Bernardino base line and meridian as shown in the left-hand diagram below.

To computerize the well data the ½ township was dropped from T. 15½ N. and T. 17½ N. The base map has been changed to extend these townships, and the sections were renumbered by adding 36 to the previous section number as shown in the right-hand diagram below.





Standard system



Revised base map

Where a Z has been substituted for the letter designating the 40-acre tract, the Z indicates that the well is plotted from unverified location descriptions; the indicated sites of such wells were visited, but no evidence of a well could be found.

Springs are numbered similarly except that an S is placed between the 40-acre subdivision letter and the final digit as shown in the following spring number: 17N/13E-24QS1.

Well 27S/59E-8P1, near Interstate Highway 15 in Nevada, is included in this compilation and is numbered with reference to the Mount Diablo base line and meridian.

WATER WELLS AND SPRINGS IN IVANPAH VALLEY

SAN BERNARDINO COUNTY, CALIFORNIA

By W. R. Moyle, Jr.

CONTENTS

ILLUSTRATIONS

TABLES

GENERAL FEATURES

Ivanpah Valley covers about 440 square miles, between long 115°07' and 115°35' W. and lat 35°10' and 35°40' N. The northeastern boundary is the California-Nevada State line, and the remaining boundary is the surface-water divide at the top of the New York Mountains on the south and the Clark and Ivanpah Mountains on the west.

The main population areas are the mining communities of Mountain Pass and Vanderbilt, and small communities along the Union Pacific railroad of Cima, Ivanpah, Nipton, and Desert Station.

The base map was compiled at a scale of 1:62,500 from all or parts of the following U.S. Geological Survey topographic maps: Clark Mountain, Roach Lake, Mescal Range, Ivanpah, Crescent Peak, Kelso, and Mid Hills.

GEOLOGIC AND HYDROLOGIC FEATURES

Geologic Units and Their Water-Bearing Character

The geologic units in Ivanpah Valley are divided into two main groups, the consolidated rocks and the unconsolidated deposits. The units within these groups may have dissimilar water-bearing characteristics, but, in general, the unconsolidated deposits, of Quaternary age, are more porous and permeable than the consolidated rocks of pre-Tertiary age. The unconsolidated deposits generally underlie the valleys and contain most of the ground water stored in the area. The consolidated rocks form the mountains and hills, surround the valley areas, underlie the unconsolidated deposits, and form the sides and bottoms of the ground-water basins. The consolidated rocks, for all practical purposes, are impermeable, but are important because they form the mountains and hills that receive most of the precipitation within the drainage areas. The runoff from those mountains and hills contributes most of the recharge to ground-water bodies contained in the unconsolidated deposits.

The oldest rocks in the area are the basement complex of pre-Tertiary age. According to Hewett (1956) they include the Cambrian Tapeats Sandstone and Bright Angel Shale, the Cambrian to Devonian(?) Goodsprings Dolomite, the Devonian Sultan Limestone, the Mississippian Monte Cristo Limestone, the Pennsylvanian Bird Spring Formation, the Pennsylvanian and Permian Supai Formation, the Permian Kaibab Limestone, the Triassic Moenkopi and Chinle Formations, and the Cretaceous Teutonia Quartz Monzonite. These rocks yield small quantities of water from highly fractured areas. The quality of the water generally is good.

The volcanic rocks, of Tertiary age, include rhyolite, andesite, basalt, agglomerate, and flow breccia and locally may yield small quantities of water to wells and springs usually along the contact with the basement complex. Generally, the water is of good quality.

The older alluvium, of Pleistocene age, consists of moderately to well-sorted sand and gravel with some clay and boulders. It underlies most of Ivanpah Valley, is the principal water-bearing unit, and yields water freely to wells in the valley. In the mountains the older alluvium may be unsaturated. The quality of water in the older alluvium ranges from good to poor. It generally deteriorates with depth.

The older fan deposits, of Pleistocene age, are composed of boulders, gravel, and sand. Near the mountains the deposits are poorly sorted and contain large boulders as much as 3 feet in diameter. Toward the valley there is better sorting and stratification, and the material is smaller in size. These deposits, where saturated, yield water to wells. Generally, the water is of good quality.

The younger alluvium, of Holocene age, is composed of unconsolidated sand and gravel, with some silt and clay. The alluvium is mostly above the regional water table in Ivanpah Valley but contains some water in the streambeds in the mountains. Where saturated, it yields water to wells. Generally, the water is of good quality.

The playa deposits, of Holocene age, are composed of clay, silt, and fine sand and yield small quantities of water to wells. The quality of the water ranges from good to poor.

Recharge and Discharge of Ground Water

Recharge to the ground-water body occurs by direct infiltration of rain or as subsurface inflow from the many small canyons in the mountains surrounding the valley. Glancy (1968, table 8) has estimated that the average recharge is on the order of 800 acre-feet per year. Rainfall ranges from 6 to 15 inches per year in the mountains but is less in the valley.

Little change in the water table has taken place since Mendenhall's survey in 1909. It seems that the only decline has been at the south end of the dry Ivanpah Lake near the Molybdenum Corp. of America well field. The decline was about 24 feet between 1953 and 1970.

Water-level measurements of wells indicate that ground water within the drainage area flows northward under Ivanpah Lake into Nevada near the town of State Line. Because no natural water losses occur south of the State line, the underflow presumably is the same as the recharge.

QUALITY OF WATER

The quality of water in Ivanpah Valley ranges from good to poor. The dissolved solids range from 188 to 12,700 mg/l (milligrams per liter). The water in the area surrounding Ivanpah Lake is of good quality at the water table but deteriorates with depth. Sidewall cores taken from well 15N/15E-59P1 at depths between 1,125 and 1,250 feet indicate that a thick bed of sodium chloride salt probably is the cause for the high dissolved solids. Well 17N/14E-36L1, 1,600 feet deep, has similar water and may penetrate the same salt bed.

GEOPHYSICAL INVESTIGATION

Two gravity investigations were made in Ivanpah Valley. One investigation, titled "Gravity Data of Pahrump, Mesquite, and Ivanpah Valleys," by Robert G. Bates, is now (1971) in preparation for publication. An unpublished gravity survey for a private individual was also made covering an area of about 9 square miles.

Seven short magnetometer profiles were made in the south end of Ivanpah Valley to detect faulting in areas covered by alluvium. Faults that come to the surface sometimes act as ground-water barriers. The interpretation of the results of the geophysical investigations is shown on the geologic map.

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TABLE 1.--*Description of wells and springs*

[Boxhead explanations are abstracted from U.S. Geological Survey "Instructions for Using the Punch-Card System for the Storage and Retrieval of Ground-Water Data"]

State well number: The wells are identified according to their location in the rectangular system for the subdivision of public land. The identification consists of the township number, north or south; the range number, east or west; and the section number. The section is further subdivided into sixteen 40-acre tracts lettered consecutively (excepting I and O), beginning with A in the northeast corner of the section and progressing in a sinusoidal manner to R in the southeast corner. Wells within the 40-acre tract are numbered sequentially. The base line and meridian are indicated by the final letter, as follows: H, Humboldt; M, Mount Diablo; S, San Bernardino.
Spring number: Springs are numbered similarly. However the letter S is added after the 40-acre tract letter to differentiate the spring from a well.

Owner or user: The apparent owner or user on the date indicated. In some cases, the local name of the well or spring is given.

Ownership:

C County
F Federal Government
M City, town, or unincorporated village
N Corporation or company, churches, lodges, and other nonprofit, nongovernment groups
P Private
S State agency
W Water district.

Use of water:

A Air conditioning
B Bottling
C Commercial
D Dewatering
E Power generation
F Fire protection
H Domestic
I Irrigation
M Medicinal
N Industrial, including mining
P Public supply
R Recreation
S Stock supply
T Institutional
U Unused
V Repressurization
W Recharge
X Desalination, public supply
Y Desalination, other use
Z Other.

Use of well:

A Anode
D Drainage
G Seismic hole
H Heat reservoir
O Observation
P Oil or gas
R Recharge
T Test hole
U Unused
W Withdraw water
X Waste disposal
Z Destroyed.

Well data: In tabulation below, C, complete data; N, no data; P, partial data. Complete physical data include depth, diameter, and finish. Complete geologic data include lithology and aquifer thickness. Complete water-level data include altitude of land-surface datum, in feet above mean sea level; water level, in feet above(+) or below land-surface datum; and date of measurement. Complete yield data include rate of pumping and drawdown.

Code symbol	1	2	3	4	5	6	7	8	9	0
Physical	C	C	P	C	C	P	C	C	P	P
Geologic	C	C	P	C	C	N	C	N	P	N
Water level	C	C	C	N	N	P	P	C	C	N
Yield	C	N	C	C	N	P	C	N	N	P

Chemical analyses:

C Complete
G Dissolved gases
J Conductance and chloride
K Conductance
L Chloride
M Multiple (complete and one or more partials)
P Partial
R Radiochemical (plus partial or comple chemical)
S Special (tritium, carbon-14, and all other special determinations)
T Trace elements (spectrographic).

Log data:

A Drilling-time
B Casing-collar
C Caliper (diameter) survey
D Driller's
E Electric
F Fluid-conductivity or fluid-resistivity
G Geologist or sample
H Magnetic
I Induction
J Gamma-ray
K Dipmeter or directional (inclinometer) survey
L Laterolog
M Microlog
N Neutron
O Microlaterolog
P Photographic
Q Radioactive-tracer
R Radiation (includes both neutron and gamma-ray)
S Sonic
T Temperature
U Temperature and fluid-conductivity (resistivity)
V Fluid-velocity
W Electric and radiation
X Electric, radiation, caliper, and fluid-velocity
Y Electric, radiation, and sample (or driller'
Z Electric, radiation, temperature, and fluid-conductivity.

Depth of well: Depth, in feet below land-surface datum, as reported by owner, driller, or others, or as measured by the Geological Survey.

Depth cased: Length of casing, in feet below land-surface datum, to the top of the first perforations.

Diameter: Inside diameter of the well, in inches; nominal inside diameter, in inches, of the innermost casing at the surface for drilled cased w

Well finish:

C Porous concrete
F Gravel wall, perforated or slotted casing
G Gravel wall, commercial screen
H Horizontal gallery or collector
O Open end
P Perforated or slotted casing
S Screen
T Sand point
W Walled or shored
X Open hole in aquifer (generally cased to aquifer)
Z Other.

Method drilled:

A Rotary
B Bored or augered
C Cable-tool
D Dug
H Hydraulic-rotary
J Jetted
P Air percussion
R Reverse-rotary
T Trenching
V Driven
W Drive-wash
Z Other.

Lift type:

A Air
B Bucket
C Centrifugal
J Jet
L Multiple (centrifugal)
M Multiple (turbine)
N None
P Piston
R Rotary
S Submergible
T Turbine
Z Other.

Power:

1 Hand
2 Natural gas engine
A 0-20 hp
B >20-50
C >50-100
D>100-200
E >200

3 Gasoline engine
F 0-5 hp
G >5-20
H >20-50
J >50-100
K >100-200
L >200

4 Diesel engine
M 0-50 hp
N >50-150
P>150-400
Q>400-750
R >750

5 Electric motc
S 0-1 hp
T >1-5
U >5-15
V>15-100
W >100
6 Wind

7 LP gas engine (propane or butane
A 0-20 hp
B >20-50
C >50-100
D>100-200
E >200
9 Other.

Altitude of lsd: Altitude of land-surface datum, in feet, above mean sea level. Land-surface datum is an arbitrary plane closely approximating land surface at the time of the first measurement and used as the plane of reference for all subsequent measurements.

Water level: Depth to water, in feet, above(+) or below land-surface datum.

Date measured: Month and year of the water-level measurement; other data given generally apply for this date.

Yield of well (or spring): Yield, in gallons per minute; drawdown, in feet.

State well number	Owner or user	Ownership	Use of water	Use of well	Well data	Chemical analyses	Log data	Depth of well (feet below lsd)	Depth cased (feet below lsd)	Diameter (inches)	Well finish	Method drilled	Year drilled	Lift type	Power	Altitude of lsd (feet)	Water level (feet below lsd)	Date measured	Yield of well: Gallons per minute	Yield of well: Drawdown (feet)
27N/59E-08P01M	E.J.PRIMM	P	H	W		C	D	600		8			1948	S	T	2602	81	1-70		
13N/14E-05J01S	J.DIMARZO	P		U				250		72	W	D		N		4200	DRY	12-69		
13N/14E-05P01S	JOHN HOLESTEN	P		U				137		8	X	C	1967	N		4240	DRY	12-69		
13N/14E-06J01S	R.COWELLS	P		Z			D	0					1964	N		4325		12-69		
13N/14E-06J02S	R.COWELLS	P		U				307		24	X	H	1965	N		4325	DRY	12-69		
13N/14E-10R01S	R.HUFF	P	U	U				100		5	X	H		N		4380	48	1-70		
13N/14E-11N01S	R.HUFF	P	U	U						4				P		4435	60	12-69		
13N/14E-11N02S	R.HUFF	P	U	U				150		5	X	H	1970	N		4405	67	1-70		
13N/14E-11N03S	R.HUFF	P	U	U				100		5	X	H	1970	N		4440	64	1-70		
13N/14E-11N04S	R.HUFF	P	U	U		C		360		5	X	H	1970	N		4435	56	1-70		
13N/15E-04E01S	R.HUFF	P	U	U				160		5	X	H	1969	N		5130	39	1-70		
13N/15E-04M01S	R.HUFF	P	U	U				115		5	X	H	1969	N		5120	24	1-70		
14N/13E-01K01S	BLM	F	U	U				100		4		H	1969	N		5045	46	12-69		
14N/13E-10D01S	J.K.SKINNER	P	H	W				91		6	F	D		P	6	5110	59	12-69		
14N/13E-10D02S	J.K.SKINNER	P	U	U				81		8	P	C		P	3	5110		12-69		
14N/13E-10D03S	J.K.SKINNER	P	H	W			D	73			P	C		P	6	5110		12-69		
14N/13E-10D04S	J.K.SKINNER	P	H	W			D	73	55	8	P	C		P	6	5110		12-69		
14N/13E-11P01S	BLM	F	U	U				20		96	X	D		N		5200	DRY	12-69		
14N/13E-13H01S	P.STATDLER	P	H	W		M		20		72		D	1890	P	6	4880		12-69		
14N/13E-13J01S	P.STATDLER	P	H	W				55		8				P	3	4880	12	12-69		
14N/13E-23R01S	J.K.SKINNER	P	U	U				5		24	O	D		N		5120	1	12-69		
14N/13E-23R02S		P	U	U				24		48	W	D		N		5120	6	12-69		
14N/13E-23R03S		P	U	U				5		60	W	D		N		5120	3	12-69		
14N/13E-25M01S	J.BELLUOMINI	P	S	W		C		50		6			1961	P	6	4960		12-69		
14N/13E-25M02S	J.BELLUOMINI	P	U	U				9		54	W	D		N		4960	7	12-69		
14N/13E-25M03S	J.BELLUOMINI	P	U	U				6		48	W	D		N		4960	DRY	12-69		
14N/13E-25M04S	J.BELLUOMINI	P	U	U				6			W	D		N		4960	DRY	12-69		
14N/14E-18E01S	P.STATDLER	P	S	W				5		96		D		Z		4888				
14N/14E-18E02S	P.STATDLER	P	U	U				8		48		D		N		4888	7	12-69		
14N/14E-18E03S	P.STATDLER	P	U	U				10		72		D		N		4860	DRY	12-69		
14N/14E-19C01S	BLM	F		Z				0						N		4735		12-69		
14N/15E-23K01S		P	U	U				15		60	W	D		P		4440	DRY	1-70		
14N/16E-02M01S	BLM	F	U	U		C		5		30	W	D		Z		4600	3	1-70		
14N/16E-03C01S	HEAVY METALS	N	U	U						72	W	D		N		4400	150	1-70		
14N/16E-03D01S	HEAVY METALS	N	U	U				425		72		D		N		4270	150	1-70		
14N/16E-03E01S	HEAVY METALS	N	U	U				77		60	W	D		N		4360	62	1-70		
14N/16E-03F01S	HEAVY METALS	N	U	U				8		60	X	A		N		4400	DRY	1-70		
14N/16E-03F02S	HEAVY METALS	N	U	U				4		5	X	A		N		4400	DRY	1-70		
14N/16E-03F03S	HEAVY METALS	N	U	U						60		D		N		4480	180	1-70		
14N/16E-03F04S	HEAVY METALS	N	U	U						72	W	D		N		4400	150	1-70		
14N/16E-03R01S	BLM	F	U	U				59		6				N		4400	58	1-70		
14N/16E-04C01S	HEAVY METALS	P	U	U				102		5	X	A		N		4360	76	1-70		
14N/16E-07L01S	BLM	F	U	U				3		72	W	D		N		4000	DRY	1-70		
14N/16E-03A01S	YOUNG WELL		S	W		M		130		10				P	6	4235	56	1-70		
14N/16E-17B01S	MEXICAN SPRING		U	U				4		36	W	D		N		4240	DRY	1-70		
15N/14E-22E01S			U	U				115		6				P		4420	107	11-69		
15N/14E-24A01S	BLM	F	U	U			D	2145		10	X	H	1966	N		3320		11-69		
15N/14E-24A02S	BLM	F	U	U						14		H				3320		11-70		
15N/14E-24A03S	BLM	F	U	U			D	2825		10	X	H	1966	N		3320	DRY	11-69		
15N/14E-28C01S	MORNING STAR	P	U	U				51		11				N		4595	DRY	11-69		
15N/14E-28C02S	MORNING STAR	P	U	U				67		60	W	D		P		4600	66	11-69		
15N/14E-33C01S	BLM	F	U	U				58		48		D		P	6	4540	56	11-69		
15N/14E-55K01S			U	U				42		8				N		4680	29	11-69		
15N/14E-57K01S	BLM	F	U	U				6		60		D	1969	N		4150	5	10-69		
15N/15E-13G01S	UPRR NO. 2	N		Z		C	D	0				C	1905	N		2927		1-70		
15N/15E-13G02S	UPRR NO. 3	N	P	W		M	D	735		18		C		M	V	2927	371	1-70		
15N/15E-13G03S	UPRR NO. 4	N	H	W		M	D	825	430	16		C	1944	S	T	2927		1-70		
15N/15E-56J01S	MOLY.CORP	N	P	W		M	D	735		12		C	1953	M	V	2705	186	1-70		
15N/15E-56J02S	MOLY.CORP	N	P	W		C	D	825	150	14		C	1966	S	V	2705				
15N/15E-57G01S	BLM	F	U	U		M	D	7		10				N		2635		11-69		

State well number	Owner or user	Ownership	Use of water	Use of well	Well data	Chemical analyses	Log data	Depth of well (feet below lsd)	Depth cased (feet below lsd)	Diameter (inches)	Well finish	Method drilled	Year drilled	Lift type	Power	Altitude of lsd (feet)	Water level (feet below lsd)	Date measured	Yield of well: Gallons per minute	Yield of well: Drawdown (feet)
15N/15E-57L01S		P	U	U		C		80		60	W	D		P		2635	DRY	11-69		
15N/15E-59N01S	BLM MURPHY WELL	F	S	W		M		110				D	1698	P	6	2630		11-69		
15N/15E-59P01S	BLM	F	U	U		M	D					H	1940	N		2630		11-69		
15N/16E-33R01S	HEAVY METALS	N	U	U				113		8				N		3880	39	1-70		
15N/16E-33R02S	HEAVY METALS	N	U	U				52		5	X	A		N		3885	45	1-70		
15N/15E-33R03S	HEAVY METALS	N	U	U				72		5	X	A		N		3320	61	1-70		
15N/16E-33R04S	HEAVY METALS	N	U	U				146		5	X	A		N		3925	74	1-70		
15N/15E-33R05S	HEAVY METALS	N	U	U				165		5	X	A		N		3880	162	1-70		
15N/15E-34L01S	HEAVY METALS	N	U	U				57		12			1967	N		3980	37	1-70		
15N/17E-08H01S	BLM	F	U	U				7		36		D		N		4600	7	11-69		
16N/13E-14J01S	STATE HWY DEPT	S	U	U		M		412		6			1953	S	S	4730	236	10-69		
16N/13E-24K01S	MOLY CORP	N	U	U										T		4840	14	11-69		
16N/13E-24L01S		P	U	U				16		12		D		N		4820	DRY	11-69		
16N/14E-01J01S	STATE HWY DEPT	S		Z		M		0						N		2630		1-70		
16N/14E-01J02S	R.SMITH	P	H	W		C		380		8		C	1961	M	H	2630				
16N/14E-11J01S	BLM	F	S	W				300		6			1962	P	6	2750	206	10-69		
16N/14E-23001S	STATE HWY DEPT	S		Z		M		0					1939	N		3075		11-69		
16N/14E-31E01S	MOLY CORP	N	U	U		M		66		10			1953	N		4524	8	10-69		
16N/14E-31E02S	MEXICAN WELL		U	U		M		2		99	0	D		N		4500	+1	10-69		
16N/14E-31L01S	STATE HWY DEPT	S		Z				0		8				J		4520		10-69		
16N/14E-31L02S	STATE HWY DEPT	S	U	J		M		104		12			1955	J		4510	24	10-69		
16N/14E-31L03S	STATE HWY DEPT	S	U	U				16		96	W	D		N		4480	+1	10-69		
16N/14E-31L04S	STATE HWY DEPT	S		Z		M		0						N		4470		10-69		
16N/14E-31N01S			U	U						6				N		4600		11-69		
16N/14E-31R01S	BLM AMYS WELL	F	S	W				20		60	W	D		P	6	4480	13	10-69		
16N/15E-06P01S	BLM YATES WELL	F	U	U		C		20		60	X	D		N		2606	DRY	11-69		
16N/15E-06N01S	BLM	F	S	W				120		8				P	6	2608	90	11-69		
16N/15E-12G01S	UPRR NO.1	N		Z		C	D	0				C	1905	N		2804		1-70		
16N/15E-12G02S	UPRR NO.2	N	U	U		M	D	588		16		C	1923	T	7	2804		1-70		
16N/15E-12G03S	UPRR NO.3	N	H	W		M	C	609		16		C	1943	S	S	2804		1-70		
16N/15E-17Z01S	BLM	F		Z				0						N		2625		11-69		
16N/15E-22Z01S	BLM	F		Z				0						N		2630		11-69		
16N/15E-33J01S	BLM	F		Z				0						N		2630		11-69		
16N/15E-33J02S	BLM	F		Z				0						N		2630		11-69		
16N/15E-33L01S	BLM	F		Z				0						N		2630		11-69		
16N/16E-33M01S	C.H.WINNEFELD	P	P	W		M		590		8	X	C		S	T	3040	540	1-70		
16N/16E-33M02S	C.H.WINNEFELD	P		Z				0				D	1915	N		3040		1-70		
17N/13E-15J01S			U	U				15		6			1958	N		5200	7	10-69		
17N/13E-15J02S			U	U				58		12				N		5198	5	10-69		
17N/13E-24M01S	BLM	F	U	U				3			X	D		N		4340	+2	10-69		
17N/13E-24001S	BLM	F	S	W				36		60	X	D		Z		4160				
17N/14E-35L01S			U	U		C		1600		9			1937	N		2655	131	10-69		
17N/14E-35R01S	STATE HWY DEPT	S	U	U		C		160		6			1959	N		2610	85	1-70		

State spring number	Owner or user or spring name	Ownership	Use of water	Use of spring	Chemical analyses	Depth of spring (feet below lsd)	Depth cased (feet below lsd)	Diameter (inches)	Temperature °C	Lift type	Power	Altitude of lsd (feet)	Water level (feet below lsd)	Date measured	Yield of spring: Gallons per minute	Yield of spring: Drawdown (feet)
13N/14E-14PS1	Burro Spring	F	S	W					11			4,440	(a)	12- 3-69		
13N/15E-4PS1	Butcherknife spring	F	S	W		5.45		72	6			5,360	c4.45	12- 4-69	0.5	
													dry	10-11-68	(b)	
13N/15E-8ES1	Cottonwood spring	F	S	W	C	5.5		30	12			5,280	c5.4	12- 4-69	.28	
						6							(b)	10-11-68		
13N/15E-8ES2	Honwood spring	F	S	W								5,320	(c)	12- 4-69	.47	
13N/15E-18BS1	Cabin spring		S	W					9			5,480	(c)	12- 4-69	.06	
14N/13E-23RS1	Cut spring	P	S	W	C				11			5,160	(c)	12- 2-69	.13	
													(c)	10-22-68		
														11- 6-17		
14N/15E-23KS1	Garvanza spring	P	S	W					2			4,360		1- 7-70	.19	
													(a)	7-24-68		
14N/15E-29AS1	Sacaton spring	P	S	W					5			4,200	(c)	1- 7-70	.06	
													(c)	7-25-68		
14N/15E-33NS1		F	U	U					(d)			4,920	(a)	1- 7-70		
14N/16E-9DS1	Slaughterhouse spring	P	S	W	C				10			4,120	(c)	1- 8-70	.38	
													(c)	2-11-67	e.5	
													(c)	6-21-62	e.25	
													(c)	5-11-61	e.5	
													(c)	1927	3	
15N/14E-2MS1	Mineral spring		S	W	C				14			4,360	(c)	11- 7-69	.10	
15N/14E-2MS1			S	W					13			4,400	(c)	11- 7-69	.05	
15N/14E-56PS1	China spring	F	U	U								4,590	(a)	11- 8-69		
													(a)	7-24-68		
15N/14E-64BS1	Wheaton spring	F	H	W								4,480	(c)	10-28-69	.56	
15N/14E-64CS1	Wheaton spring	F	H	W					16			4,520	(c)	10-28-69	.35	
15N/16E-36AS1	Willow spring								10			4,540	(c)	1-20-70	.12	
15N/17E-19DS1	BLM											4,390	(a)	1-19-70		
15N/17E-19NS1	Dove spring		S	W	C				14			5,000	(a)	1-19-70		
15N/17E-19NS2			S	W					13			5,000	(c)	1-19-70	.94	
16N/13E-1FS1	Burro spring	F	U	U					11			4,970	(f)	10-29-69		
16N/13E-11AS1												5,020	dry	10-29-69		

See footnotes at end of table.

State spring number	Owner or user or spring name	Ownership	Use of water	Use of spring		Chemical analyses		Depth of spring (feet below lsd)	Depth cased (feet below lsd)	Diameter (inches)	Temperature °C			Lift type	Power	Altitude of lsd (feet)	Water level (feet below lsd)	Date measured	Yield of spring: Gallons per minute	Yield of spring: Drawdown (feet)
16N/13E-24LS1	Mescal spring		S	W		C					12					4,840	(c)	11- 8-69	1.95	
16N/13E-24QS1	BLM	F	S	W							10 14					4,080	(c) (c)	2-25-70 10-28-69	.005 .08	
16N/13E-24RS1	Groaner spring	F	U	U							14					4,640	(c)	11- 8-69	.63	
16N/14E-19FS1		P	U	U		C					11					4,560	(a)	11- 6-69		
16N/14E-20ES1		F	S	W		C					18					4,200	(a)	11- 6-69	.04	
17N/13E-13LS1	Whiskey spring	F	U	U												4,900	dry	11- 5-69		
17N/13E-14NS1		F	S	W							10					4,950	(f)	10-30-69		
17N/13E-14NS2		F	S	W							16					5,000	(f)	10-30-69		
17N/13E-23CS1	BLM	F	S	W							14					4,720	(f)	10-30-69		
17N/13E-26AS1			H	W							18					4,640		11- 5-69	2.25	

a. Pond, no visible flow.

b. No flow.

c. Flowing.

d. Water in spring frozen; air temperature below 0°C.

e. Estimated.

f. Seep and large amount of brush.

TABLE 2.--*Records of water level*

Letter(s) following water-level measurements:

A Well being pumped.
B Well pumped recently.
C Nearby well being pumped.
D Nearby well pumped recently.
E Estimated.
F Dry.
G Measurement by outside agency or person.
H Tape measurement (recorder).
I Affected by outside influence (wind, atmospheric pressure, ocean tides, railroad trains).
J Water level below sea level.
K Measurement from recorder chart.
M Obstruction in well above water surface.
N No measurement.
O Measurement discontinued.
P Well destroyed.
Q Flowing.

27N/59E-8P1 M. DEPTH 600 FT IN 1948. ALTITUDE ABOUT 2,602 FT.
HIGHEST WATER LEVEL 72.90 FT BELOW LSD, MAY 11, 1961.
LOWEST STATIC WATER LEVEL 83.30 FT BELOW LSD, MAR. 27, 1963.
RECORDS AVAILABLE: 1961, 1963, 1967, 1970.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 11, 1961	72.9	MAR. 27, 1963	83.3	FEB. 15, 1967	81.79	JAN. 30, 1970	81.35

13N/14E-5J1 S. DEPTH 200 FT IN 1927 AND 250.0 IN 1969. ALTITUDE ABOUT 4,200 FT.
RECORDS AVAILABLE: 1927, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
1927	F	DEC. 3, 1969	F				

13N/14E-6J1 S. DEPTH 900 FT IN 1964 AND 0 FT IN 1969. ALTITUDE ABOUT 4,325 FT.
RECORDS AVAILABLE: 1964, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
1964	F	DEC. 3, 1969	P				

13N/14E-6J2 S. DEPTH 325 FT IN 1965 AND 306.5 FT IN 1969. ALTITUDE ABOUT 4,325 FT.
RECORDS AVAILABLE: 1964, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
1965	F	DEC. 3, 1969	F				

14N/13E-11P1 S. DEPTH 200 FT IN 1927 AND 20 FT IN 1969. ALTITUDE ABOUT 5,200 FT.
HIGHEST WATER LEVEL 70.00 FT BELOW LSD, , 1927.
LOWEST STATIC WATER LEVEL 70.00 FT BELOW LSD, , 1927.
RECORDS AVAILABLE: 1927, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
1927	70	DEC. 2, 1969	F				

14N/13E-13H1 S. DEPTH 17 FT IN 1953 AND 20 FT IN 1969. ALTITUDE ABOUT 4,880 FT.
HIGHEST WATER LEVEL 12.00 FT BELOW LSD, APR. 16, 1953.
LOWEST STATIC WATER LEVEL 15.00 FT BELOW LSD, MAR. 28, 1963.
RECORDS AVAILABLE: 1953, 1960, 1963.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
APR. 16, 1953	12	MAY 15, 1960	14.4	MAR. 28, 1963	15.0		

14N/14E-18F1 S. DEPTH 4.6 FT IN 1969. ALTITUDE ABOUT 4,388 FT.
HIGHEST WATER LEVEL 4.06 FT BELOW LSD, DEC. 1, 1969.
LOWEST STATIC WATER LEVEL 4.06 FT BELOW LSD, DEC. 1, 1969.
RECORDS AVAILABLE: 1909, 1915-16, 1927, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
1909	Q	AUG. 23, 1916	Q	1927	Q	DEC. 1, 1969	4.060
1915	Q						

14N/14E-19C1 S. DEPTH 0 FT IN 1969. ALTITUDE ABOUT 4,735 FT.
RECORDS AVAILABLE: 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC. 1, 1969	P						

14N/16E-3D1 S. DEPTH 425 FT IN 1929. ALTITUDE ABOUT 4,270 FT.
HIGHEST WATER LEVEL 150.00 FT BELOW LSD, JAN. 9, 1970.
LOWEST STATIC WATER LEVEL 200.00 FT BELOW LSD, , 1929.
RECORDS AVAILABLE: 1929, 1970.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
1929	200	JAN. 9, 1970	150				

14N/16E-3F1 S. DEPTH 200 FT IN 1967 AND 8.2 FT IN 1970. ALTITUDE ABOUT 4,400 FT.
HIGHEST WATER LEVEL 65.00 FT BELOW LSD, , 1967.
LOWEST STATIC WATER LEVEL 65.00 FT BELOW LSD, , 1967.
RECORDS AVAILABLE: 1967, 1970.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
1967	65	JAN. 9, 1970	F				

14N/16E-3F2 S. DEPTH 220 FT IN 1967 AND 3.7 FT IN 1970. ALTITUDE ABOUT 4,400 FT.
RECORDS AVAILABLE: 1970.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
1967	F	JAN. 9, 1970	F				

14N/16E-7L1 S. DEPTH 3.0 FT IN 1970. ALTITUDE ABOUT 4,000 FT.
HIGHEST WATER LEVEL 1.00 FT BELOW LSD, JUNE 25, 1968.
LOWEST STATIC WATER LEVEL 6.00 FT BELOW LSD, NOV. 3, 1968.
RECORDS AVAILABLE: 1968, 1970.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUNE 25, 1968	1	NOV. 3, 1968	6	JAN. 8, 1970	F		

14N/16E-9A1 S. DEPTH 200 FT IN 1958 AND 130.4 FT IN 1970. ALTITUDE ABOUT 4,235 FT.
HIGHEST WATER LEVEL 55.60 FT BELOW LSD, MAY 7, 1964.
LOWEST STATIC WATER LEVEL 165.20 FT BELOW LSD, MAY 22, 1958.
RECORDS AVAILABLE: 1958-61, 1964, 1970.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 22, 1958	165.2	MAY 16, 1960	61.6	MAY 7, 1964	55.6	JAN. 9, 1970	56.37
MAY 19, 1959	123.0	MAY 11, 1961	121.0				

14N/16E-17B1 S. DEPTH 30 FT IN 1927 AND 4.0 FT IN 1970. ALTITUDE ABOUT 4,240 FT.
HIGHEST WATER LEVEL 20.00 FT BELOW LSD, , 1927.
LOWEST STATIC WATER LEVEL 20.00 FT BELOW LSD, , 1927.
RECORDS AVAILABLE: 1927, 1970.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
1927	20	JAN. 8, 1970	F				

15N/14E-24A1 S. DEPTH 2,145 FT IN 1966. CEMENT PLUG 322 TO 425 FT. WELL PLUGGED WITH CEMENT AT SURFACE IN 1969. ALTITUDE ABOUT 3,320 FT.
RECORDS AVAILABLE: 1966, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT. 28, 1966	F	NOV. 7, 1969	Z				

15N/14E-28C2 S. DEPTH 66.6 FT IN 1969. ALTITUDE ABOUT 4,600 FT.
HIGHEST WATER LEVEL 66.20 FT BELOW LSD, NOV. 7, 1969.
LOWEST STATIC WATER LEVEL 90.00 FT BELOW LSD, , 1949.
RECORDS AVAILABLE: 1949, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
1949	90	NOV. 7, 1969	66.20				

15N/14E-57K1 S. DEPTH 6.0 FT IN 1969. ALTITUDE ABOUT 4,150 FT.
HIGHEST WATER LEVEL 5.20 FT BELOW LSD, OCT. 28, 1969.
LOWEST STATIC WATER LEVEL 5.20 FT BELOW LSD, OCT. 28, 1969.
RECORDS AVAILABLE: 1927, 1960, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
1927	Q	SEP. 2, 1960	Q	OCT. 28, 1969	5.2		

15N/15E-13G1 S. DEPTH 530 FT IN 1905 AND 0 FT IN 1970. ALTITUDE ABOUT 2,927 FT.
HIGHEST WATER LEVEL 370.00 FT BELOW LSD, AUG. 30, 1905, OCT. , 1917.
LOWEST STATIC WATER LEVEL 370.00 FT BELOW LSD, AUG. 30, 1905, OCT. , 1917.
RECORDS AVAILABLE: 1905, 1917, 1970.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG. 30, 1905	370	OCT. 1917	370	JAN. 22, 1970	P		

15N/15E-13G2 S. DEPTH 822 FT IN 1923 AND 735 FT IN 1940. ALTITUDE ABOUT 2,927 FT.
HIGHEST WATER LEVEL 367.00 FT BELOW LSD, MAY 15, 1923.
LOWEST STATIC WATER LEVEL 392.00 FT BELOW LSD, , 1940.
RECORDS AVAILABLE: 1923, 1940, 1970.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 15, 1923	367	1940	392	JAN. 22, 1970	370.55		

15N/15E-13G3 S. DEPTH 825 FT IN 1944. ALTITUDE ABOUT 2,927 FT.
HIGHEST WATER LEVEL 367.00 FT BELOW LSD, OCT. 21, 1944.
LOWEST STATIC WATER LEVEL 373.10 FT BELOW LSD, SEP. 14, 1954.
RECORDS AVAILABLE: 1944, 1953-56, 1958-64, 1967.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT. 21, 1944	367	MAY 21, 1955	367.3	MAY 15, 1959	370.0	MAR. 27, 1963	371.0
APR. 22, 1953	373.0	MAY 24, 1956	369.2	MAY 12, 1960	368.5	MAY 6, 1964	372.2
MAY 8, 1954	367.5	NOV. 16	367.5	MAY 11, 1961	371.0	MAR. 14, 1967	368
SEP. 14	373.1	MAY 4, 1958	367.3	JUNE 21, 1962	371.6		

15N/15E-56J1 S. DEPTH 735 FT IN 1953. ALTITUDE ABOUT 2,705 FT.
HIGHEST WATER LEVEL 165.90 FT BELOW LSD, MAY 24, 1956.
LOWEST STATIC WATER LEVEL 186.00 FT BELOW LSD, JAN. 5, 1970.
RECORDS AVAILABLE: 1953-54, 1956, 1970.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
APR. 1953	170	MAY 24, 1956	165.9	JAN. 5, 1970	186.0	JAN. 22, 1970	185.5
MAY 8, 1954	168.0	NOV. 16	166.3				

15N/15E-56J2 S. DEPTH 825 FT IN 1966. ALTITUDE ABOUT 2,705 FT.
HIGHEST WATER LEVEL 189.30 FT BELOW LSD, JAN. 12, 1970.
LOWEST STATIC WATER LEVEL 192.50 FT BELOW LSD, JAN. 1, 1970.
RECORDS AVAILABLE: 1970.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN. 1, 1970	192.5	JAN. 12, 1970	189.3	JAN. 22, 1970	449 A		

15N/15E-57G1 S. DEPTH 412 FT BEFORE 1916 AND 7.1 FT IN 1969. ALTITUDE ABOUT 2,635 FT.
HIGHEST WATER LEVEL 89.00 FT BELOW LSD, AUG. 12, 1916.
LOWEST STATIC WATER LEVEL 97.50 FT BELOW LSD, MAY 13, 1957.
RECORDS AVAILABLE: 1916, 1956-61, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG. 12, 1916	89	MAY 13, 1957	97.5	MAY 15, 1959	92.8	MAY 11, 1961	94.2
NOV. 16, 1956	93.1	MAY 21, 1958	93.2	MAY 15, 1960	92.4	NOV. 7, 1969	P

15N/15E-57L1 S. DEPTH 90 FT IN 1916, 100 FT IN 1959, AND 79.7 FT IN 1969. ALTITUDE ABOUT 2,635 FT.
HIGHEST WATER LEVEL 88.00 FT BELOW LSD, , 1916.
LOWEST STATIC WATER LEVEL 94.00 FT BELOW LSD, MAY 15, 1959.
RECORDS AVAILABLE: 1916, 1959, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
1916	88	MAY 15, 1959	94.0	NOV. 7, 1969	F		

15N/15E-59N1 S. DEPTH 125 FT WITH 12 FT TUNNEL AT BOTTOM IN 1898. DEPTH 110.5 FT IN 1969.
ALTITUDE ABOUT 2,630 FT.
HIGHEST WATER LEVEL 90.00 FT BELOW LSD, JAN. 15, 1965.
LOWEST STATIC WATER LEVEL 105.00 FT BELOW LSD, SEP. 14, 1954.
RECORDS AVAILABLE: 1916-17, 1953-56, 1958-60, 1965, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
1916	92	SEP. 14, 1954	105.0	NOV. 16, 1956	99.5	MAY 15, 1960	99.5
OCT. 26, 1917	100	MAY 21, 1955	98.2	MAY 21, 1958	100 A	JAN. 15, 1965	90
SEP. 11, 1953	99.9	SEP. 29	100.1	MAY 15, 1959	102.2 A	NOV. 7, 1969	102.08A
MAY 8, 1954	102.0	MAY 24, 1956	101.6				

15N/15E-59P1 S. DEPTH 2,211 FT IN 1940, AND BEING REDRILLED IN 1970. ALTITUDE ABOUT 2,630 FT.
HIGHEST WATER LEVEL 106.00 FT BELOW LSD, MAY 15, 1959.
LOWEST STATIC WATER LEVEL 106.00 FT BELOW LSD, MAY 15, 1959.
RECORDS AVAILABLE: 1959.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 15, 1959	106.0						

16N/13E-14J1 S. DEPTH 412 FT IN 1953. ALTITUDE ABOUT 4,730 FT.
HIGHEST WATER LEVEL 236.60 FT BELOW LSD, MAY 11, 1961.
LOWEST STATIC WATER LEVEL 287.70 FT BELOW LSD, MAY 21, 1958.
RECORDS AVAILABLE: 1953-54, 1956, 1958-61, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
SEP. 11, 1953	277.7	SEP. 14, 1954	287.4	MAY 15, 1959	282.0	MAY 11, 1961	236.6
MAY 21	287.4	MAY 24, 1956	283.3	MAY 15, 1960	279.9	OCT. 29, 1969	237.98
MAY 8, 1954	284.3	MAY 21, 1958	287.7				

16N/14E-1J1 S. DEPTH 160 FT IN 1939 AND 0 FT IN 1970. ALTITUDE ABOUT 2,630 FT.
HIGHEST WATER LEVEL 89.00 FT BELOW LSD, JULY , 1939, SEP. 11, 1953.
LOWEST STATIC WATER LEVEL 107.70 FT BELOW LSD, SEP. 14, 1954.
RECORDS AVAILABLE: 1939, 1953-55, 1958, 1960-61, 1970.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JULY 1939	89	SEP. 14, 1954	107.7	MAY 21, 1958	98.8	MAY 11, 1961	100.9
SEP. 11, 1953	89.0	MAY 21, 1955	100.1	MAY 15, 1960	98.7	JAN. 30, 1970	P
MAY 8, 1954	106.2						

16N/14E-23Q1 S. DEPTH 544 FT IN 1939 AND 0 FT IN 1969. ALTITUDE ABOUT 3,075 FT.
HIGHEST WATER LEVEL 515.00 FT BELOW LSD, AUG. 15, 1953.
LOWEST STATIC WATER LEVEL 515.00 FT BELOW LSD, AUG. 15, 1953.
RECORDS AVAILABLE: 1953, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG. 15, 1953	515.0	NOV. 7, 1969	P				

16N/14E-31F1 S. DEPTH 150 FT IN 1953 AND 65.8 FT IN 1969. ALTITUDE ABOUT 4,524 FT.
HIGHEST WATER LEVEL 8.44 FT BELOW LSD, OCT. 28, 1969.
LOWEST STATIC WATER LEVEL 16.60 FT BELOW LSD, MAY 11, 1961.
RECORDS AVAILABLE: 1955, 1958-61, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 21, 1955	9.3	MAY 15, 1959	13.4	MAY 11, 1961	16.6	FEB. 27, 1970	9.90
MAY 21, 1958	10.8	MAY 15, 1960	13.3	OCT. 28, 1969	8.44		

16N/14E-31E2 S. DEPTH 2.2 FT IN 1969. ALTITUDE ABOUT 4,500 FT.
HIGHEST WATER LEVEL 1.32 FT ABOVE LSD, OCT. 28, 1969.
LOWEST STATIC WATER LEVEL 0.70 FT ABOVE LSD, FEB. 27, 1970.
RECORDS AVAILABLE: 1917, 1954, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT. 27, 1917 +	.9	MAR. 29, 1954 +	.9	OCT. 28, 1969 +	1.32	FEB. 27, 1970 +	.70

16N/14E-31L2 S. DEPTH 104 FT IN 1955 AND 104.2 FT IN 1969. ALTITUDE ABOUT 4,510 FT.
HIGHEST WATER LEVEL 24.02 FT BELOW LSD, OCT. 28, 1969.
LOWEST STATIC WATER LEVEL 39.30 FT BELOW LSD, MAY 15, 1959.
RECORDS AVAILABLE: 1955, 1958-60, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
APR. 15, 1955	31.0	MAY 21, 1958	26.0	MAY 15, 1960	33.0	OCT. 28, 1969	24.02
SEP. 28	24.8	MAY 15, 1959	39.3				

16N/14E-31L4 S. DEPTH 140 FT IN 1956 AND 0 FT IN 1969. ALTITUDE ABOUT 4,470 FT.
HIGHEST WATER LEVEL 20.50 FT BELOW LSD, MAY 21, 1958.
LOWEST STATIC WATER LEVEL 21.60 FT BELOW LSD, MAY 13, 1957.
RECORDS AVAILABLE: 1954, 1957-59, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
SEP. 15, 1954	84.8 A	MAY 21, 1958	20.5	MAY 15, 1959	21.5	OCT. 28, 1969	P
MAY 13, 1957	21.6						

16N/14E-31R1 S. DEPTH 20.3 FT IN 1969. ALTITUDE ABOUT 4,480 FT.
HIGHEST WATER LEVEL 13.30 FT BELOW LSD, OCT. 28, 1969.
LOWEST STATIC WATER LEVEL 14.00 FT BELOW LSD, SEP. 1, 1968.
RECORDS AVAILABLE: 1968-69.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
SEP. 1, 1968	14	OCT. 28, 1969	13.30				

16N/15E-6P1 S. DEPTH 91 FT IN 1916 AND 20 FT IN 1969. ALTITUDE ABOUT 2,606 FT.
HIGHEST WATER LEVEL 81.00 FT BELOW LSD, AUG. 24, 1916.
LOWEST STATIC WATER LEVEL 81.00 FT BELOW LSD, AUG. 24, 1916.
RECORDS AVAILABLE: 1916, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG. 24, 1916	81	NOV. 6, 1969	F				

16N/15E-6N1 S. DEPTH 120 FT IN 1966. ALTITUDE ABOUT 2,608 FT.
HIGHEST WATER LEVEL 88.66 FT BELOW LSD, FEB. 15, 1967.
LOWEST STATIC WATER LEVEL 89.89 FT BELOW LSD, NOV. 6, 1969.
RECORDS AVAILABLE: 1968-69.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
FEB. 15, 1967	88.66	NOV. 6, 1969	89.89				

16N/15E-12Q1 S. DEPTH 506 FT IN 1905 AND 0 FT IN 1970. ALTITUDE ABOUT 2,804 FT.
HIGHEST WATER LEVEL 275.00 FT BELOW LSD, MAR. 23, 1905, OCT. 25, 1917.
LOWEST STATIC WATER LEVEL 275.00 FT BELOW LSD, MAR. 23, 1905, OCT. 25, 1917.
RECORDS AVAILABLE: 1905, 1917, 1970.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAR. 23, 1905	275	OCT. 25, 1917	275	JAN. 27, 1970	P		

16N/15E-12Q2 S. DEPTH 588 FT IN 1923. ALTITUDE ABOUT 2,804 FT.
HIGHEST WATER LEVEL 270.00 FT BELOW LSD, NOV. 21, 1923.
LOWEST STATIC WATER LEVEL 270.00 FT BELOW LSD, NOV. 21, 1923.
RECORDS AVAILABLE: 1923.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV. 21, 1923	270						

16N/15E-12Q3 S. DEPTH 609 FT IN 1943. ALTITUDE ABOUT 2,804 FT.
HIGHEST WATER LEVEL 325.00 FT BELOW LSD, DEC. 30, 1943.
LOWEST STATIC WATER LEVEL 367.00 FT BELOW LSD, OCT. 21, 1944.
RECORDS AVAILABLE: 1943-44.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC. 30, 1943	325	OCT. 21, 1944	367				

16N/15E-17Z1 S. DEPTH 88 FT IN 1917 AND 0 FT IN 1969. ALTITUDE ABOUT 2,625 FT.
HIGHEST WATER LEVEL 77.00 FT BELOW LSD, , 1917.
LOWEST STATIC WATER LEVEL 77.00 FT BELOW LSD, , 1917.
RECORDS AVAILABLE: 1917, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
1917	77	NOV. 9, 1969	P				

16N/15E-22Z1 S. DEPTH 120 FT IN 1917 AND 0 FT IN 1969. ALTITUDE ABOUT 2,630 FT.
HIGHEST WATER LEVEL 79.00 FT BELOW LSD, , 1917.
LOWEST STATIC WATER LEVEL 79.00 FT BELOW LSD, , 1917.
RECORDS AVAILABLE: 1917, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
1917	79	NOV. 9, 1969	P				

16N/15E-33J1 S. DEPTH 120 FT IN 1917 AND 0 FT IN 1969. ALTITUDE ABOUT 2,630 FT.
HIGHEST WATER LEVEL 82.50 FT BELOW LSD, , 1917.
LOWEST STATIC WATER LEVEL 82.50 FT BELOW LSD, , 1917.
RECORDS AVAILABLE: 1917, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
1917	82.5	NOV. 9, 1969	P				

16N/15E-33J2 S. DEPTH 120 FT IN 1917 AND 0 FT IN 1969. ALTITUDE ABOUT 2,630 FT.
HIGHEST WATER LEVEL 84.00 FT BELOW LSD, , 1917.
LOWEST STATIC WATER LEVEL 84.00 FT BELOW LSD, , 1917.
RECORDS AVAILABLE: 1917, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
1917	84	NOV. 9, 1969	P				

16N/15E-33L1 S. DEPTH 120 FT IN 1917 AND 0 FT IN 1969. ALTITUDE ABOUT 2,630 FT.
HIGHEST WATER LEVEL 87.00 FT BELOW LSD, , 1917.
LOWEST STATIC WATER LEVEL 87.00 FT BELOW LSD, , 1917.
RECORDS AVAILABLE: 1917, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
1917	87	NOV. 9, 1969	P				

17N/13E-24Q1 S. DEPTH 36.4 FT IN 1970. ALTITUDE ABOUT 4,160 FT.
HIGHEST WATER LEVEL 29.68 FT BELOW LSD, FEB. 25, 1970.
LOWEST STATIC WATER LEVEL 29.68 FT BELOW LSD, FEB. 25, 1970.
RECORDS AVAILABLE: 1969-70.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT. 28, 1969	Q	FEB. 25, 1970	29.68Q				

17N/14E-36L1 S. DEPTH 1,600 FT IN 1937, CASED TO 800 FT. ALTITUDE ABOUT 2,655 FT.
HIGHEST WATER LEVEL 131.28 FT BELOW LSD, MAR. 14, 1967.
LOWEST STATIC WATER LEVEL 131.29 FT BELOW LSD, OCT. 29, 1969.
RECORDS AVAILABLE: 1967, 1969.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAR. 14, 1967	131.28	OCT. 29, 1969	131.29				

17N/14E-36R1 S. DEPTH 160 FT IN 1959. ALTITUDE ABOUT 2,610 FT.
HIGHEST WATER LEVEL 84.95 FT BELOW LSD, JAN. 30, 1970.
LOWEST STATIC WATER LEVEL 85.00 FT BELOW LSD, MAY 15, 1959.
RECORDS AVAILABLE: 1959, 1970.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 15, 1959	85.0	JAN. 30, 1970	84.95				

TABLE 3.--*Drillers' logs*

The depth given in this table is the depth reported by the driller and is not necessarily the developed depth of the well. The depth given in tables 1 and 2 is measured or reported depth on the date indicated. The name given is that of the driller.

27S/59E-8P1 M. Altitude about 2,602 feet.

	Thickness (feet)	Depth (feet)
Clay, brown	40	40
Clay, yellow	45	85
Lime	10	95
Gravel	5	100
Lime	15	115
Gravel	5	120
Gravel, cemented and brown	45	165
Clay, red	10	175
Clay, brown, with gravel	55	230
Lime, hard and pink	60	290
Clay, red	10	300
Rock, basalt, broken	30	330
Lime, hard and pink	65	395
Gravel, cemented	70	465
Clay, brown, with gravel	30	495
Rock, lime, broken	15	510
Lime, hard and brown	20	530
Gravel	10	540
Clay, sandy and pink	35	575
Lime, hard and smooth and pink	15	590
Clay, brown	10	600

13N/14E-6J1 S. Drilled by Lowell Mann in 1964. Altitude about 4,325 feet.

	Thickness (feet)	Depth (feet)
Alluvium	900	900

14N/13E-10D3 S. Redrilled by Ephrim Harris, 63 to 73 feet. Altitude about 5,110 feet.

	Thickness (feet)	Depth (feet)
No record	63	63
Rock, hard and white	2	65
Rock, softer and white	6	71
Rock, hard	2	73

14N/13E-10D4 S. Redrilled by Ephrim Harris 67-73 feet. 8-inch casing 0-55 feet, 6-inch casing 53-73 feet; perforated 55-73 feet. Altitude about 5,110 feet.

	Thickness (feet)	Depth (feet)
No record	67	67
Rock, hard and white	6	73

15N/14E-24A1 S. Drilled by Coachella Valley Pump and Supply, Inc. in 1966. 10¾-inch casing 0-400 feet, open hole to 2,207 feet. Altitude about 3,320 feet.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand, coarse and gravel----------------	235	235	Sand, fine to medium, with clay, cemented---	120	780
Sand, medium to coarse, cemented with clay----	105	340	Sand, medium, cemented--------------	45	825
Sand, fine to coarse, cemented--------------	125	465	Sand, fine to medium, with clay-------------	15	840
Sand, medium, and clay-	15	480	Quartz, rose-----------	30	870
Sand, medium, and clay, cemented-------------	75	555	Rock, black, cemented--	375	1,245
Sand, fine to medium, with clay-------------	30	585	Sand, fine to medium, cemented--------------	340	1,585
Sand, fine to medium, cemented--------------	75	660	Sand, fine to medium, loose-----------------	12	1,597
			Rock, very hard, black-	610	2,207

15N/14E-24A3 S. Drilled by Coachella Valley Pump and Supply, Inc. in 1966. 10-inch casing 0-679 feet, open hole 679-2,825 feet. Altitude about 3,320 feet.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Alluvium---------------	620	620	Quartz, monzonite------	2,205	2,825

15N/15E-13G1 S. Drilled in 1905. 13½-inch casing 0-256 feet, and 11 5/8-inch casing 256-530 feet; perforated 370-520 feet. Altitude about 2,927 feet.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand and gravel--------	125	125	Sand------------------	25	250
Granite boulders and sand------------------	100	225	Gravel and boulders---	75	325
			Sand and gravel-------	205	530

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)

15N/15E-13G2 S. Drilled in 1923. 16-inch casing 0-822 feet; perforated 487-508 feet, and 609-640 feet. Altitude about 2,927 feet.

Gravel------------------	16	16	Sand and clay, cemented --------------	84	591
Gravel, cemented-------	29	45	Gravel, cemented-------	74	665
Gravel, and sand, cemented--------------	24	69	Sand, cemented---------	32	697
Sand, cemented---------	46	115	Sand and clay, cemented--------------	19	716
Gravel, cemented-------	20	135	Gravel, cemented-------	73	789
Gravel and boulders, cemented--------------	283	418	Sand and clay, cemented--------------	33	822
Sand, cemented---------	67	485			
Gravel, cemented-------	22	507			

15N/15E-13G3 S. Drilled by Roscoe Moss Co. in 1944. 16-inch casing 0-825 feet; perforated 430-808 feet. Altitude about 2,927 feet.

Sand, coarse, gravel and some boulders-----	33	33	Clay, sand and gravel--	22	456
Sand, gravel-----------	42	75	Sand, gravel, and clay, tight-----------------	167	623
Sand, gravel, and some clay------------------	12	87	Clay, with some sand and gravel------------	60	683
Sand, gravel and some rock, tight-----------	347	434	Sand, and some gravel, tight-----------------	142	825

15N/15E-56J1 S. Drilled by S. B. Rodgers in 1953. 16-inch casing 0-32 feet, 12-inch casing 0-210 feet, 10-inch casing 195-735 feet; perforated 170-210 feet. Altitude about 2,705 feet.

Sand and silt----------	2	2	Clay, soft and sticky, green-----------------	5	620
Conglomerate, gray-----	153	155	Conglomerate, hard with flint-----------------	10	630
Clay, red--------------	20	175	"Gumbo," tough and sticky----------------	20	650
Gravel and sand--------	3	178	Clay, sandy and soft---	5	655
Clay, red--------------	20	198	Lime, hard, lavender---	5	660
Lime, brown------------	2	200	"Gumbo," tough and sticky----------------	30	690
Clay, red, and gravel--	60	260	Gravel-----------------	5	695
Conglomerate, brown----	75	335	Clay, sticky-----------	5	700
Shale, sandy and green-	50	385	Sand and gravel--------	5	705
Slate, green, hard streaks---------------	45	430	"Sylvan" shale---------	25	730
Clay, green------------	10	440	Conglomerate-----------	5	735
Shale, green with hard streaks---------------	135	575			
Conglomerate, hard-----	40	615			

15N/15E-56J2 S. Drilled by S. B. Rodgers in 1966. 14-inch casing 0-450 feet, 12-inch casing 450-750 feet, 10-inch casing 750-825 feet; perforated 150-450, 700-825 feet. Altitude about 2,705 feet.

	Thickness (feet)	Depth (feet)
Silt, sand, and gravel-	30	30
Sand, gravel, and boulders--------------	160	190
Gravel, loose----------	5	195
Rocks and clay in beds-	130	325
Clay, green, with beds of rock----------	125	450
Clay, blue, and sand---	350	800
Gravel and clay, mixed-	25	825

15N/15E-57G1 S. Altitude about 2,635 feet.

	Thickness (feet)	Depth (feet)
Silt------------------	40	40
Clay------------------	55	95
Clay, tough------------	57	152
"Hardpan"-------------	21	173
"Hardpan" and shale----	37	210
Clay, blue-------------	20	230
Shale-----------------	38	268
"Hardpan" and clay------	1	269
Shale and rocks---------	31	300
Clay, dark--------------	6	306
"Hardpan"---------------	12	318
Shale, white------------	20	338
"Hardpan" and shale-----	62	400
Gravel-----------------	12	412

15N/15E-59P1 S. Drilled in 1940. Sidewall cores collected in 1958 at selected intervals between 1,141 and 2,175 feet. Well being redrilled in 1970 (log not included). Altitude about 2,630 feet.

	Thickness (feet)	Depth (feet)
Sand, gravel, and silt-	60	60
Sand, shale, and shells, hard-----------------	180	240
Shale and sand, hard---	5	245
Shale, and shells, hard	8	253
Sand and shale---------	32	285
Shale, sand, shells and some salt---------	1,665	1,950
Conglomerate-----------	20	1,970
Shale, sand, and shells and some salt, hard	241	2,210

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)

16N/15E-12Q1 S. Drilled in 1905. 13-inch casing 0-182 feet, 12-inch casing 0-350 feet, 10-inch casing 265-506 feet; perforated 330-490 feet. Altitude about 2,804 feet.

Sand and gravel--------	96	96	Gravel-----------------	18	402
Gravel, coarse and large stones----------	169	265	Sand-------------------	11	413
Gravel-----------------	85	350	Gravel-----------------	74	487
Sand-------------------	34	384	Mud--------------------	4	491
			Clay-------------------	15	506

16N/15E-12Q2 S. Drilled by Southern California Well Drilling Co. in 1923. 16-inch casing 0-576 feet, open hole 576-588 feet; perforated 505-550 feet. Altitude about 2,804 feet.

Gravel and boulders----	20	20	Gravel and boulders, cemented--------------	45	425
Boulders---------------	34	54	Boulders---------------	30	455
Gravel and boulders----	44	98	Gravel and boulders----	50	505
Boulders---------------	31	129	Boulders---------------	7	512
Gravel and boulders----	82	211	Gravel and boulders----	21	533
Boulders---------------	52	263	Gravel and boulders cemented--------------	17	550
Gravel and boulders, cemented--------------	90	353	Boulders, cemented-----	38	588
Gravel and boulders----	27	380			

16N/15E-12Q3 S. Drilled by Roscoe Moss Co. in 1943. 16-inch casing 0-592 feet; perforated 325-564 feet. Altitude about 2,804 feet.

Sand and boulders------	20	20	Gravel and yellow clay-	22	325
Sand, boulders, and gravel----------------	35	55	Rocks and gravel-------	50	375
Boulders, hard---------	5	60	Boulders and clay------	47	422
Boulders and gravel----	130	190	Boulders and gravel----	90	512
Boulders and gravel, cemented--------------	32	222	Rocks and clay---------	53	565
Boulders and gravel----	81	303	Boulders---------------	17	582
			Rocks, fractured-------	20	602
			Bedrock----------------	1	603

[Results in milligrams per liter except for iron

State well number	Date of collection	Depth of well (feet)	Water temperature (°C)	Results in milligrams per liter: Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)
WELLS											
27N/59E-08P01 M	05-15-60	--	--	11	--	8.0	5.0	743	2.0	201	14
27N/59E-08P01 M	05-11-61	--	21	8.0	--	13	6.7	1050	8.8	163	29
27N/59E-08P01 M	03-27-63	--	--	--	--	8.0	5.0	775	3.0	238	--
27N/59E-08P01 M	05-26-64	--	--	11	--	18	.0	840	6.0	246	0
13N/14E-11N04 S	01-20-70	--	--	--	--	83	25	62	7.0	149	0
14N/13E-13H01 S	04-16-53	--	16	--	--	50	9.0	50	1.9	234	0
14N/13E-13H01 S	05-24-56	--	--	30	--	38	13	32	.9	171	0
14N/13E-13H01 S	05-15-60	--	--	24	--	37	8.0	32	1.2	153	0
14N/13E-13H01 S	06-22-62	--	--	--	--	--	--	--	--	146	0
14N/13E-13H01 S	03-28-63	--	--	27	--	50	13	47	1.6	210	0
14N/13E-13H01 S	05-06-64	--	20	--	--	32	10	40	1.0	165	0
14N/13E-13H01 S	02-12-67	--	18	9.8	--	53	13	42	1.0	215	0
14N/13E-25M01 S	12-02-69	--	6	--	--	73	17	42	3.0	187	0
14N/16E-02M01 S	11-07-69	--	5	--	--	70	47	85	1.0	445	0
14N/16E-09A01 S	05-22-58	--	--	13	--	300	117	143	12	191	0
14N/16E-09A01 S	05-16-59	--	--	23	--	271	118	138	12	159	0
14N/16E-09A01 S	05-11-61	--	--	--	--	--	--	--	--	151	0
15N/15E-13G01 S	08-24-16	530	--	17	300	26	4.1	49	--	73	0
15N/15E-13G02 S	05-04-35	822	--	12	--	13	--	52	--	--	--
15N/15E-13G02 S	02-24-44	735	--	16	--	11	--	52	--	--	--
15N/15E-13G03 S	10-21-44	825	--	18	--	15	--	49	1.7	--	--
15N/15E-13G03 S	05-02-49	--	--	18	20	2.0	3.9	43	--	54	0
15N/15E-13G03 S	04-22-53	--	--	--	--	1.7	.5	53	.5	73	7
15N/15E-13G03 S	09-11-53	--	--	--	--	8.0	1.0	52	1.8	66	7
15N/15E-13G03 S	05-08-54	--	--	--	--	8.2	.0	47	1.0	77	0
15N/15E-13G03 S	09-14-54	--	--	--	--	8.0	.6	49	.8	92	0
15N/15E-13G03 S	05-21-55	--	--	--	--	--	--	--	--	59	10
15N/15E-13G03 S	09-29-55	--	--	--	--	--	--	--	--	54	10
15N/15E-13G03 S	05-24-56	--	--	--	--	--	--	--	--	137	0
15N/15E-13G03 S	11-16-56	--	--	--	--	--	--	--	--	59	10
15N/15E-13G03 S	05-13-57	--	--	20	--	4.0	3.0	48	.8	79	0
15N/15E-13G03 S	05-21-58	--	--	19	--	3.0	1.0	49	1.5	70	6
15N/15E-13G03 S	05-15-59	--	--	15	--	4.0	.0	47	1.2	76	0
15N/15E-13G03 S	05-15-60	--	--	--	--	--	--	--	--	76	0
15N/15E-13G03 S	05-11-61	--	--	--	--	--	--	--	--	51	12
15N/15E-13G03 S	06-21-62	--	--	16	--	6.0	.0	52	1.2	52	12
15N/15E-13G03 S	03-27-63	--	--	18	--	4.0	1.0	48	.8	65	5
15N/15E-13G03 S	05-06-64	--	--	17	--	10	.0	50	1.1	79	0
15N/15E-13G03 S	02-11-67	--	17	--	--	6.0	2.0	49	1.0	45	17
15N/15E-56J01 S	09-11-53	--	--	--	--	18	5.0	130	7.4	105	0
15N/15E-56J01 S	03-29-54	--	--	--	--	25	5.3	124	7.8	111	0
15N/15E-56J01 S	05-08-54	--	24	--	--	24	9.1	129	7.8	109	0
15N/15E-56J01 S	09-14-54	--	24	--	--	24	6.0	123	8.4	110	0
15N/15E-56J01 S	05-21-55	--	--	--	--	--	--	--	--	98	7
15N/15E-56J01 S	09-29-55	--	--	--	--	26	8.0	150	9.3	115	0
15N/15E-56J01 S	05-24-56	--	21	--	--	--	--	--	--	122	0
15N/15E-56J01 S	11-16-56	--	21	--	--	--	--	--	--	102	0
15N/15E-56J01 S	05-13-57	--	--	30	--	32	1.0	135	7.7	113	0
15N/15E-56J01 S	05-21-58	--	22	--	--	--	--	--	--	113	0
15N/15E-56J01 S	05-15-59	--	22	--	--	--	--	--	--	104	0
15N/15E-56J01 S	05-15-60	--	23	--	--	--	--	--	--	110	0
15N/15E-56J01 S	09-02-60	--	--	--	--	27	6.0	137	8.2	88	14
15N/15E-56J01 S	05-11-61	--	24	--	--	--	--	--	--	113	0
15N/15E-56J01 S	06-21-62	--	--	--	--	--	--	--	--	107	0
15N/15E-56J01 S	03-27-63	--	--	21	--	30	4.9	140	6.5	110	0
15N/15E-56J01 S	05-26-64	--	--	21	--	37	9.0	150	7.5	116	0
15N/15E-56J01 S	01-06-70	--	--	--	--	6.4	9.2	136	8.3	132	0
15N/15E-56J02 S	01-06-70	--	--	--	--	2.9	2.8	167	13	139	0
15N/15E-57G01 S	08-24-16	--	--	41	1400	15	5.0	101	--	171	12
15N/15E-57G01 S	05-21-55	--	--	--	--	17	6.0	105	6.2	154	0

and boron which are in micrograms per liter]

Results in milligrams per liter--Continued									Percent sodium	Specific conductance (micromhos at 25°C)	pH
Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Sum of determined constituents	Dissolved solids: Residue on evaporation at 180°C	Hardness as $CaCO_3$	Noncarbonate hardness as $CaCO_3$			
					WELLS						
202	901	7.2	9.5	1300	--	2010	43	--	97	3390	8.4
263	1320	9.0	.0	3200	--	2800	61	0	97	4830	8.8
210	940	10	3.2	--	--	2180	41	0	97	3700	8.7
217	1040	3.0	4.5	1600	--	2230	45	0	97	3700	8.2
154	116	.9	2.0	180	--	560	309	123	30	949	7.6
26	41	.4	8.4	270	--	306	--	--	40	509	7.5
25	34	.4	3.1	70	--	294	--	--	32	428	8.0
20	35	.3	3.0	90	--	212	125	--	35	390	7.8
--	32	--	--	--	--	--	128	8	--	399	7.8
33	47	.4	3.3	100	--	332	180	7	36	550	7.8
25	32	.2	.0	100	--	232	122	0	42	400	8.2
31	44	.4	4.5	90	--	345	185	9	33	543	7.9
70	64	.8	33	170	--	439	252	--	26	706	7.5
72	66	.9	1.0	240	--	591	366	--	33	1000	--
957	254	.2	4.5	0	--	1650	1230	--	20	2520	7.6
958	252	.6	1.4	170	--	1950	1160	--	20	2480	7.7
--	264	--	--	--	--	--	1280	--	--	2600	7.7
73	35	--	5.0	--	245	240	82	--	57	--	--
38	26	--	12	--	203	187	--	--	78	--	--
39	22	--	8.0	--	188	188	--	--	80	--	--
53	25	--	6.0	--	202	203	--	--	73	--	--
31	18	.4	7.3	680	--	--	--	--	82	238	7.4
25	16	1.0	6.0	80	--	156	6	--	94	237	8.1
35	18	.8	9.4	100	--	168	24	--	81	286	8.9
27	18	.9	9.3	100	--	184	20	--	82	229	8.0
23	18	.8	8.5	200	--	163	4	--	82	254	8.2
--	17	--	--	--	--	--	--	--	--	257	9.0
--	16	1.1	--	--	--	--	15	--	--	256	8.7
--	14	--	--	--	--	--	12	--	--	210	8.1
--	20	--	--	--	--	--	16	--	--	255	8.0
30	21	.7	4.0	60	--	175	23	0	82	245	8.0
25	18	.6	4.5	0	--	171	13	0	89	260	8.8
23	18	.8	4.3	30	--	155	10	--	90	232	7.4
--	17	--	--	--	--	--	17	--	--	255	7.9
--	14	--	--	--	--	--	13	0	--	243	8.8
30	21	.8	11	40	--	142	15	0	87	269	8.8
31	14	.9	5.0	60	--	166	12	0	87	280	8.8
31	21	.8	5.7	100	--	188	25	0	80	260	8.0
30	23	.8	8.0	70	--	222	25	0	81	294	8.9
36	166	1.6	6.4	240	--	432	65	--	79	793	7.9
30	166	1.6	7.5	200	--	472	84	--	74	850	7.9
33	175	2.0	6.2	250	--	477	81	--	72	845	8.1
28	174	1.5	9.1	300	--	462	85	--	74	813	7.2
--	177	--	--	--	--	--	--	--	--	822	8.3
57	198	2.0	7.9	140	--	554	97	--	75	1020	8.0
--	163	--	--	--	--	--	65	--	--	840	7.7
--	164	--	--	--	--	--	64	--	--	800	7.2
41	172	1.6	4.5	220	--	475	--	--	76	794	7.5
--	182	--	--	--	--	--	95	--	--	864	7.9
--	175	--	--	--	--	--	93	--	--	873	7.8
--	176	--	--	--	--	--	89	--	--	829	7.7
41	193	1.5	2.5	230	--	466	92	0	74	851	8.5
--	176	--	--	--	--	--	88	0	--	830	8.0
--	176	--	--	--	--	--	93	5	--	833	7.8
35	181	2.0	11	230	--	480	94	4	75	860	7.9
78	196	1.4	4.5	200	--	552	130	35	70	860	7.9
25	194	--	--	--	--	620	--	--	82	880	7.2
88	206	--	--	--	--	690	--	--	91	1035	7.3
31	61	--	.0	--	--	372	58	--	79	--	--
28	80	2.4	15	860	--	381	67	--	75	572	8.2

State well number	Date of collection	Depth of well (feet)	Water temperature (°C)	Results in milligrams per liter							
				Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)
WELLS											
15N/15E-57G01 S	05-24-56	--	19	--	--	23	2.0	98	6.0	178	0
15N/15E-57G01 S	11-16-56	--	19	--	--	25	6.0	124	8.6	151	0
15N/15E-57G01 S	05-13-57	--	--	--	--	--	--	--	--	144	0
15N/15E-57L01 S	05-15-59	98	--	33	--	37	9.0	157	8.2	140	0
15N/15E-59N01 S	10-26-16	--	--	59	130	28	20	55	--	211	0
15N/15E-59N01 S	09-11-53	--	--	--	--	27	19	46	4.5	193	0
15N/15E-59N01 S	05-08-54	--	20	--	--	30	20	47	4.4	196	0
15N/15E-59N01 S	09-14-54	--	20	--	--	28	22	43	5.5	189	0
15N/15E-59N01 S	05-21-55	--	--	--	--	--	--	--	--	183	0
15N/15E-59N01 S	09-29-55	--	--	--	--	--	--	--	--	190	0
15N/15E-59N01 S	05-24-56	--	--	--	--	--	--	--	--	195	0
15N/15E-59N01 S	11-16-56	--	--	--	--	--	--	--	--	200	0
15N/15E-59N01 S	05-13-57	--	19	50	--	28	19	45	3.8	193	0
15N/15E-59N01 S	05-21-58	--	--	42	--	26	21	46	4.2	189	0
15N/15E-59N01 S	05-15-59	--	21	--	--	--	--	--	--	189	0
15N/15E-59N01 S	12-07-59	--	--	45	--	24	21	56	6.0	202	0
15N/15E-59N01 S	05-11-61	--	--	--	--	--	--	--	--	207	0
15N/15E-59N01 S	02-04-67	--	--	--	--	27	19	46	5.0	192	0
15N/15E-59N01 S	11-07-69	--	7	--	--	29	20	42	5.0	182	0
15N/15E-59P01 S	05-15-59	--	22	47	--	617	280	3560	51	137	0
15N/15E-59P01 S	01-22-70	300	--	--	--	331	83	1560	23	164	0
16N/13E-14J01 S	09-11-53	--	--	--	--	68	32	30	2.1	320	0
16N/13E-14J01 S	05-08-54	--	--	--	--	76	28	32	2.0	312	0
16N/13E-14J01 S	09-14-54	--	--	--	--	72	34	27	1.8	323	0
16N/13E-14J01 S	05-21-55	--	--	--	--	--	--	--	--	317	0
16N/13E-14J01 S	05-21-58	--	--	--	--	--	--	--	--	311	0
16N/13E-14J01 S	05-15-59	--	--	--	--	--	--	--	--	299	0
16N/13E-14J01 S	05-15-60	--	--	--	--	--	--	--	--	317	0
16N/13E-14J01 S	05-11-61	--	--	26	--	51	23	75	3.0	279	0
16N/13E-14J01 S	06-21-62	--	--	27	--	65	26	39	2.0	305	0
16N/13E-14J01 S	07-12-67	--	--	--	--	53	21	64	4.0	215	14
16N/14E-01J01 S	09-11-53	--	21	--	--	42	19	60	3.0	195	0
16N/14E-01J01 S	05-08-54	--	21	--	--	42	22	60	2.9	203	0
16N/14E-01J01 S	09-14-54	--	--	--	--	45	20	57	3.1	199	0
16N/14E-01J01 S	05-21-55	--	--	--	--	--	--	--	--	176	0
16N/14E-01J01 S	09-28-55	--	--	--	--	--	--	--	--	190	0
16N/14E-01J01 S	05-24-56	--	--	--	--	--	--	--	--	205	0
15N/14E-01J01 S	11-16-56	--	--	--	--	--	--	--	--	190	0
16N/14E-01J01 S	05-21-58	--	--	23	--	40	21	61	3.1	202	0
16N/14E-01J01 S	05-15-59	--	--	--	--	--	--	--	--	189	0
16N/14E-01J01 S	05-15-60	--	--	--	--	--	--	--	--	200	0
16N/14E-01J02 S	08-28-69	--	--	--	--	7.8	4.0	165	2.8	230	0
16N/14E-23Q01 S	09-11-53	--	--	--	--	44	34	65	4.2	183	0
16N/14E-23Q01 S	05-08-54	--	--	--	--	45	31	71	3.9	136	0
16N/14E-23Q01 S	09-14-54	--	--	--	--	45	32	66	4.3	159	0
16N/14E-23Q01 S	05-21-55	--	--	--	--	--	--	--	--	142	0
16N/14E-23Q01 S	09-28-55	--	--	--	--	--	--	--	--	154	0
16N/14E-23Q01 S	05-24-56	--	20	--	--	--	--	--	--	144	0
16N/14E-23Q01 S	11-16-56	--	--	--	--	--	--	--	--	161	0
16N/14E-23Q01 S	05-12-57	--	--	30	--	44	32	65	4.0	163	0
16N/14E-23Q01 S	05-21-58	--	--	--	--	--	--	--	--	162	0
16N/14E-23Q01 S	05-15-59	--	--	22	--	38	30	69	5.5	137	0
16N/14E-23Q01 S	05-15-60	--	--	--	--	--	--	--	--	145	0
16N/14E-23Q01 S	05-11-61	--	--	--	--	--	--	--	--	137	12
16N/14E-31F01 S	05-15-59	--	17	29	--	89	33	56	2.0	253	0
16N/14E-31E01 S	05-15-60	--	--	--	--	--	--	--	--	268	0
16N/14E-31E01 S	05-11-61	--	16	30	0	83	36	57	2.1	240	0
16N/14E-31E01 S	12-05-69	--	--	--	--	261	145	163	5.0	124	0
16N/14E-31E02 S	10-27-17	--	--	45	270	79	48	96	--	342	0
16N/14E-31E02 S	03-29-54	--	--	--	--	142	61	73	3.2	257	0
16N/14E-31E02 S	09-15-54	--	17	--	--	142	73	87	2.6	238	0
16N/14E-31F02 S	12-05-69	--	--	--	--	1630	630	1260	47	148	0
16N/14E-31L02 S	05-21-55	--	19	--	--	97	51	65	1.3	434	0
16N/14E-31L02 S	09-28-55	--	--	--	--	98	51	70	1.9	417	0
16N/14E-31L02 S	05-24-56	--	--	--	--	102	54	70	1.8	412	0

Results in milligrams per liter--Continued									Percent sodium	Specific conductance (micromhos at 25°C)	pH
Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Sum of determined constituents	Dissolved solids: Residue on evaporation at 180°C	Hardness as $CaCO_3$	Noncarbonate hardness as $CaCO_3$			
WELLS											
27	139	2.5	6.5	280	--	420	--	--	74	549	7.7
27	137	2.0	9.4	--	--	420	--	--	73	765	7.8
--	146	--	--	--	--	--	87	--	--	784	7.3
65	195	1.6	8.7	120	--	497	128	--	71	915	8.2
51	30	--	2.8	--	--	335	152	--	44	--	--
48	24	1.4	4.5	140	--	312	145	--	40	492	7.9
49	30	1.4	15	150	--	334	157	--	39	454	8.1
39	28	1.0	9.7	200	--	308	161	--	36	464	7.3
--	27	--	--	--	--	--	--	--	--	498	8.2
--	29	1.2	--	--	--	--	156	--	--	510	8.0
--	27	--	--	--	--	--	143	--	--	490	7.6
--	30	--	--	--	--	--	149	--	--	460	7.4
49	27	.8	5.0	160	--	325	149	--	39	455	7.6
48	33	.9	3.6	280	--	304	150	--	39	485	8.0
--	28	--	--	--	--	--	155	--	--	497	7.5
54	36	1.3	.0	380	--	400	145	--	44	578	7.6
--	--	--	--	--	--	--	153	0	--	520	7.7
49	25	1.2	7.0	120	--	325	146	0	40	485	8.1
51	27	1.1	7.0	90	--	314	156	--	36	499	7.8
1440	6150	.8	5.5	400	--	12700	2690	--	74	15400	7.5
1820	1740	.3	100	950	--	6100	1170	--	74	8670	7.8
37	51	.4	5.5	120	--	414	351	--	18	679	7.5
37	54	.2	6.8	200	--	436	306	--	18	700	7.7
25	53	.2	7.5	200	--	418	320	--	15	680	7.6
--	51	--	--	--	--	--	--	--	--	702	7.7
--	56	--	--	--	--	--	305	50	--	713	7.6
--	55	--	--	--	--	--	295	50	--	700	7.7
--	57	--	--	--	--	--	302	--	--	685	7.8
37	72	.5	4.0	130	--	436	220	--	42	758	7.9
33	46	.3	12	70	--	--	--	--	24	650	8.0
36	84	.6	5.5	140	--	412	220	21	38	703	8.5
44	67	.3	15	160	--	293	--	--	41	641	7.8
48	71	.2	18	100	--	429	--	--	40	633	7.6
36	67	.3	17	180	--	264	195	--	38	851	8.0
--	67	--	--	--	--	--	--	--	--	619	8.2
--	69	--	--	--	--	--	185	--	--	623	7.8
--	66	--	--	--	--	--	182	--	--	556	7.7
--	70	--	--	--	--	--	178	--	--	840	7.4
45	73	.2	13	340	--	412	185	--	41	638	7.7
--	69	--	--	--	--	--	185	--	--	630	--
--	--	--	--	--	--	--	184	--	--	624	7.5
51	99	--	--	--	--	393	--	--	90	--	7.2
75	116	.8	14	240	--	487	250	--	36	841	7.6
76	121	.9	17	250	--	535	237	--	39	794	7.6
64	120	.6	13	280	--	456	242	--	37	757	8.0
--	118	--	--	--	--	--	--	--	--	779	8.2
--	120	--	--	--	--	--	240	--	--	736	7.9
--	118	--	--	--	--	--	206	--	--	689	7.7
--	124	--	--	--	--	--	232	--	--	780	7.5
75	121	.6	12	140	--	525	--	--	36	735	7.7
--	127	--	--	--	--	--	240	107	--	797	8.1
71	117	.9	10	150	432	394	218	105	40	820	7.9
--	124	--	--	--	--	--	222	103	--	760	7.7
--	123	--	--	--	--	--	233	101	--	772	8.3
159	73	.9	6.0	160	--	474	358	--	25	920	7.8
--	70	--	--	--	--	--	368	--	--	885	7.7
172	65	.9	3.4	150	--	573	356	159	26	886	7.7
113	957	1.3	22	290	--	2350	1250	--	22	3270	7.9
189	88	--	2.4	--	--	746	394	--	35	--	--
166	272	1.6	1.2	100	--	1120	606	--	21	1560	7.6
173	319	1.5	3.2	280	--	1090	658	--	22	1700	7.8
282	7130	1.5	190	200	--	13900	6660	--	29	20700	7.2
156	47	.8	5.0	680	--	687	401	--	24	1030	7.9
162	54	1.0	13	280	--	681	453	--	25	1100	7.4
187	71	.8	5.5	200	--	735	--	--	24	1040	7.6

State well number	Date of collection	Depth of well (feet)	Water temperature (°C)	Results in milligrams per liter							
				Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)
					WELLS						
16N/14E-31L02 S	05-13-57	--	16	--	--	--	--	--	--	425	0
16N/14E-31L02 S	05-21-58	--	17	26	--	92	52	76	1.9	464	0
16N/14E-31L02 S	05-15-59	--	--	30	--	247	133	100	3.5	333	0
16N/14E-31L02 S	05-15-60	--	--	--	--	--	--	--	--	334	0
16N/14E-31L02 S	05-11-61	--	19	33	0	150	92	90	2.4	354	0
16N/14E-31L02 S	03-27-63	--	--	32	--	67	41	128	3.5	302	0
16N/14E-31L04 S	11-17-56	--	18	46	--	133	93	126	4.7	349	0
16N/14E-31L04 S	05-13-57	--	--	--	--	--	--	--	--	337	0
16N/14E-31L04 S	05-21-58	--	--	9.0	--	124	108	124	4.2	262	0
16N/14E-31L04 S	05-15-59	--	--	20	--	195	114	115	5.1	345	0
16N/14E-31L04 S	05-15-60	--	--	25	--	212	123	105	2.7	317	0
16N/14E-31L04 S	05-11-61	--	--	23	0	234	153	139	4.8	304	0
16N/15E-06P01 S	08-24-16	--	--	30	--	201	158	2420	--	402	0
16N/15E-12Q01 S	10-28-15	--	--	17	--	26	19	107	--	154	0
16N/15E-12Q02 S	04-13-23	--	--	24	--	29	3.9	42	--	--	--
16N/15E-12Q02 S	01-28-24	--	--	22	--	43	4.1	94	--	--	--
16N/15E-12Q03 S	06-08-43	--	--	18	--	20	16	93	--	--	--
16N/15E-12Q03 S	07-07-43	--	--	34	--	23	1.5	77	--	--	--
16N/15E-12Q03 S	10-21-44	--	--	18	--	15	4.3	49	--	--	--
16N/15E-12Q03 S	09-11-53	--	--	--	--	20	18	82	5.0	151	0
16N/15E-12Q03 S	05-00-54	--	--	--	--	25	19	83	4.7	156	0
16N/15E-12Q03 S	09-14-54	--	--	--	--	24	18	82	5.1	159	0
16N/15E-12Q03 S	05-21-55	--	26	--	--	--	--	--	--	134	0
16N/15E-12Q03 S	09-29-55	--	26	--	--	--	--	--	--	146	0
16N/15E-12Q03 S	05-24-56	--	25	--	--	--	--	--	--	156	0
16N/15E-12Q03 S	11-16-56	--	--	--	--	--	--	--	--	161	0
16N/15E-12Q03 S	05-13-57	--	--	30	--	22	20	75	4.7	153	0
16N/15E-12Q03 S	05-21-58	--	--	--	--	--	--	--	--	154	0
16N/15E-12Q03 S	05-15-59	--	--	29	--	22	18	78	5.0	153	0
16N/15E-12Q03 S	05-15-60	--	--	--	--	--	--	--	--	161	0
16N/15E-12Q03 S	05-11-61	--	--	--	--	--	--	--	--	156	0
16N/15E-12Q03 S	06-21-62	--	--	28	--	23	18	82	4.5	156	0
16N/15E-12Q03 S	03-27-63	--	--	22	--	22	18	84	4.5	154	0
16N/15E-12Q03 S	05-06-64	--	--	23	--	23	18	86	4.5	157	0
16N/15E-12Q03 S	02-11-67	--	--	--	--	23	19	81	4.0	153	0
16N/16E-33M01 S	05-10-54	--	26	--	--	8.0	1.1	105	2.5	131	0
16N/16E-33M01 S	07-14-54	--	23	--	--	6.0	.6	96	2.0	122	0
16N/16E-33M01 S	09-29-55	--	22	--	--	--	--	--	--	100	10
16N/16E-33M01 S	05-24-56	--	25	--	--	--	--	--	--	134	0
16N/16E-33M01 S	11-16-56	--	--	--	--	--	--	--	--	122	0
16N/16E-33M01 S	05-13-57	--	20	20	--	5.0	2.0	98	7.8	132	0
16N/16E-33M01 S	05-21-58	--	28	--	--	--	--	--	--	133	0
16N/16E-33M01 S	05-15-59	--	22	--	--	--	--	--	--	101	8
16N/16E-33M01 S	05-15-60	--	--	25	--	3.3	2.9	107	2.5	129	0
16N/16E-33M01 S	05-11-61	--	--	--	--	--	--	--	--	117	5
16N/16E-33M01 S	06-21-62	--	--	--	--	--	--	--	--	131	0
16N/16E-33M01 S	03-27-63	--	--	23	--	7.0	1.0	104	2.1	122	3
16N/16E-33M01 S	05-06-64	--	--	21	--	8.0	.0	104	2.1	117	8
17N/14E-36L01 S	05-21-55	--	--	--	--	99	28	4600	45	134	0
17N/14E-36R01 S	09-03-57	--	--	38	--	8.0	6.0	334	48	717	14
					SPRINGS						
13N/15E-08CS1 S	12-04-69	--	11.7	--	--	111	51	55	--	438	0
14N/13E-23RS1 S	11-06-17	--	--	45	660	67	18	44	--	236	0
14N/13E-23RS1 S	12-02-69	--	10.6	--	--	64	16	40	2.0	227	0
14N/16E-09QS1 S	05-16-59	--	--	53	--	80	26	50	5.5	232	0
14N/16E-09QS1 S	05-16-60	--	--	53	--	77	26	27	3.4	235	0
14N/16E-09QS1 S	05-11-61	--	16.7	55	--	81	24	25	2.9	242	0
14N/16E-09QS1 S	06-21-62	--	--	--	--	--	--	--	--	244	0
14N/16E-09QS1 S	05-21-63	--	--	60	--	75	27	31	3.6	244	0
14N/16E-09QS1 S	02-11-67	--	12.8	--	--	80	27	26	3.0	240	--
15N/14E-02NS1 S	11-07-69	--	14.4	--	--	70	47	65	1.0	445	0
15N/16E-36AS1 S	01-20-70	--	10.0	--	--	58	24	24	4.0	221	0
15N/17E-19NS1 S	01-19-70	--	14.4	--	--	46	12	19	3.5	170	0
16N/13E-24LS1 S	11-08-69	--	12.2	--	--	50	44	26	1.0	343	0
16N/14E-19FS1 S	11-06-69	--	11.1	--	--	30	96	73	2.0	470	0
16N/14E-20ES1 S	11-06-69	--	17.8	--	--	14	69	53	1.5	340	0

Results in milligrams per liter--Continued											
					Dissolved solids						
Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Sum of determined constituents	Residue on evaporation at 180°C	Hardness as $CaCO_3$	Noncarbonate hardness as $CaCO_3$	Percent sodium	Specific conductance (micromhos at 25°C)	pH
WELLS											
--	86	--	--	--	--	--	481	--	--	1090	7.7
137	56	.5	7.2	240	--	762	442	--	27	1110	7.4
188	649	.9	7.4	180	--	1860	1160	--	16	2740	8.0
--	595	--	--	--	--	--	1090	--	--	2500	7.4
170	354	.9	2.8	240	--	1320	778	488	21	1840	8.0
65	131	.2	7.3	530	--	504	223	0	45	895	8.2
220	329	1.0	.8	200	--	1340	714	--	28	1780	7.5
--	--	--	--	--	--	--	765	--	--	1870	7.9
186	428	.6	.0	300	--	1260	752	--	26	2000	7.3
181	493	1.0	3.2	240	--	1570	905	--	21	2490	8.0
185	550	1.0	4.8	230	--	1660	1040	--	18	2410	7.7
172	750	1.1	2.4	240	--	--	--	--	20	2900	7.9
429	3980	--	.0	--	--	7700	1150	--	82	--	--
93	139	--	--	--	433	--	143	--	62	--	--
61	40	--	--	--	236	--	--	--	51	--	--
109	102	--	5.1	--	421	--	--	--	62	--	--
43	110	--	1.0	--	367	398	--	--	64	--	--
47	80	--	--	--	353	365	--	--	72	--	--
53	25	--	6.0	--	203	202	--	--	66	--	--
41	92	1.0	12	220	--	358	124	--	58	644	7.9
38	96	1.4	19	200	--	378	143	--	55	643	7.9
35	96	1.2	14	310	--	362	132	--	56	625	7.9
--	92	--	--	--	--	--	--	--	--	648	8.2
--	95	1.2	--	--	--	--	141	--	--	602	7.8
--	95	--	--	--	--	--	131	--	--	645	7.9
--	94	--	--	--	--	--	133	--	--	590	7.6
41	95	1.2	10	240	--	375	137	12	53	585	7.5
--	100	--	--	--	--	--	134	--	--	662	8.0
34	96	1.1	17	170	--	305	130	5	56	660	8.1
--	101	--	--	--	--	--	130	--	--	649	7.5
--	95	--	--	--	--	--	128	0	--	645	7.7
32	96	1.2	11	220	--	377	133	5	57	664	7.8
33	96	.8	12	420	--	378	129	2	58	670	7.2
40	100	.8	11	280	--	372	133	4	58	630	8.0
38	100	1.1	15	200	--	423	137	12	56	686	8.2
41	65	2.1	19	200	--	326	25	--	89	528	8.2
27	64	1.4	14	350	--	293	18	--	91	487	7.4
--	60	1.6	--	--	--	--	11	--	--	445	8.7
--	60	--	--	--	--	--	18	--	--	513	7.9
--	46	--	--	--	--	--	20	--	--	495	8.1
37	61	2.0	11	220	--	315	20	--	87	485	7.6
--	63	--	--	--	--	--	20	--	--	520	8.2
--	59	--	--	--	--	--	20	--	--	520	8.8
36	65	1.5	11	240	--	319	20	--	91	512	7.5
--	62	--	--	--	--	--	17	0	--	514	8.3
--	62	--	--	--	--	--	23	0	--	517	8.0
38	60	1.0	12	200	--	296	18	0	90	500	8.5
39	63	1.6	12	280	--	326	20	0	91	490	8.5
629	6800	2.3	.0	3800	--	12300	312	--	96	19200	8.2
30	110	.2	6.2	1400	952	928	42	0	87	1340	8.8
SPRINGS											
148	57	.6	.5	150	--	695	486	--	20	1080	8.1
61	57	--	.1	--	--	433	241	--	28	--	--
54	44	.8	17	170	--	377	224	--	28	631	7.4
86	50	.4	5.5	40	--	444	305	--	26	684	8.0
85	50	.6	4.0	70	--	489	301	--	16	680	7.5
62	51	.8	5.4	90	--	508	301	103	15	689	7.4
--	53	--	--		--	--	315	115	--	708	7.9
84	57	.5	5.0	180	--	565	297	97	16	686	7.8
82	51	.6	5.5	120	--	503	310	113	15	694	8.0
72	66	.9	1.0	240	--	551	366	--	33	1600	7.9
41	52	.6	3.0	100	--	275	243	--	17	596	7.7
23	28	.5	9.0	60	--	167	164	--	20	426	7.5
37	24	.3	8.0	30	--	403	306	--	16	672	7.9
106	82	1.0	3.0	210	--	664	470	--	25	1140	8.0
69	52	1.5	2.0	190	--	464	320	--	26	819	7.9

TABLE 5.--*Pumping tests*

Time: Time of measurement, in minutes, after pump was started.

Static water level: The depth to water, in feet below or above (+) land-surface datum, prior to start of test.

Pumping water level: The depth to water, in feet below or above (+) land-surface datum, at end of test.

Drawdown: The difference, in feet, between the static and pumping water levels.

Yield: The yield of the well, in gallons per minute, for drawdown indicated.

Specific capacity: Yield, in gallons per minute, divided by drawdown, in feet. The specific capacity is a measure of the physical condition of the well and the aquifer or aquifers which it penetrates. A well with a large specific capacity is capable of a greater yield than a well with a small specific capacity.

State well number	Date	Time (minutes)	Static water level (feet)	Pumping water level (feet)	Drawdown (feet)	Yield (gpm)	Specific capacity (gpm/ft of dd)
14N/13E-10D01 S	12 07 69			57.4		1.9	
14N/13E-10D02 S		120	59			15.0	
14N/13E-10D03 S			59			7.0	
14N/13E-10D04 S		120	59			15.0	
14N/13E-10D04 S	12 02 69					2.8	
14N/13E-13H01 S	02 12 67					10.0	
14N/13E-25M01 S	12 02 69					3.0	
14N/14E-18E01 S	15					1.0	
14N/14E-18E01 S	27					2.0	
14N/16E-02M01 S	11 07 69			4.7		0.1	
15N/14E-57K01 S	27					3.0	
15N/15E-13G01 S	08 30 05		370		15	147.0	9.80
15N/15E-13G02 S	05 15 23		367		20	200.0	10.00
15N/15E-13G02 S	40		392		35	200.0	5.71
15N/15E-13G03 S	10 21 44		367		56	300.0	5.35
15N/15E-56J01 S	04 53		170	179	9	600.0	66.66
15N/15E-56J01 S	09 11 53				92	300.0	3.26
15N/15E-56J01 S	05 08 54					300.0	
15N/15E-56J01 S	09 14 54					110.0	
15N/15E-56J01 S	01 05 70	5355	186.0	253.1	67.1	400.0	5.96
15N/15E-56J01 S	01 22 70	20	185.5	237.5	52	300.0	5.76
15N/15E-56J02 S	01 01 70	540	192.5	379.3	186.8	340.0	1.82
15N/15E-56J02 S	01 12 70		189.3	448.4	259.1	275.0	1.06
15N/15E-56J02 S	01 22 70			449		275.0	
15N/15E-57G01 S			90		50	100.0	2.00

State well number	Date	Time (minutes)	Static water level (feet)	Pumping water level (feet)	Drawdown (feet)	Yield (gpm)	Specific capacity (gpm/ft of dd)
15N/15E-59N01 S	10 26 17					17.0	
15N/15E-59N01 S	01 18	240				20.0	
15N/15E-59N01 S	05 21 58					0.2	
15N/15E-59N01 S	01 15 65		90			6.5	
15N/15E-59N01 S	02 14 67					1.0	
15N/15E-59N01 S	11 07 69			102.1		1.0	
16N/13E-14J01 S	09 11 53		277.7			6.6	
16N/14E-01J01 S	09 11 53		89			10.0	
16N/14E-01J02 S	01 30 70		90	120.6	30.6	45.0	1.47
16N/14E-23Q01 S	08 15 53		515.0			5.0	
16N/14E-31E01 S	53					10.0	
16N/14E-31L02 S	09 28 55		24.8			4.0	
16N/14E-31L04 S	11 17 56					0.4	
16N/15E-06N01 S	66					6.0	
16N/15E-12Q01 S	03 23 05		275			80.0	
16N/15E-12Q02 S	11 21 23		270	279	9	80.0	8.89
16N/15E-12Q02 S	10 04 45					175.0	
16N/15E-12Q03 S	12 30 43		325		21	305.0	14.52
16N/15E-12Q03 S	10 21 44		367	423	56	300.0	5.36
16N/15E-12Q03 S	10 04 45					300.0	
16N/15E-12Q03 S	02 11 67					15.0	
16N/16E-33M01 S	09 14 54					10.0	

MAPS OF IVANPAH VALLEY

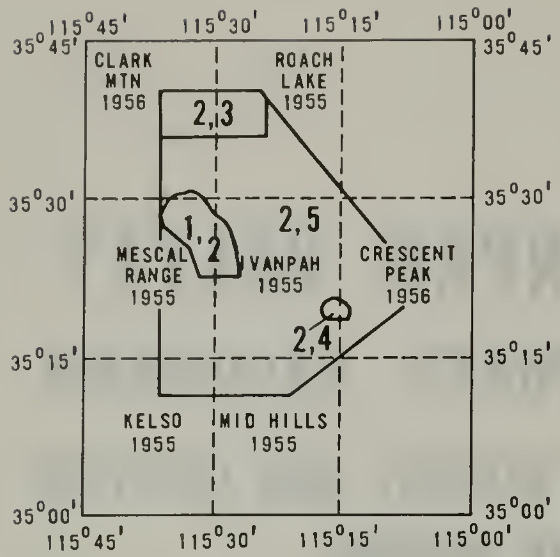
SAN BERNARDINO COUNTY, CALIFORNIA

SHOWING RECONNAISSANCE GEOLOGY AND LOCATION OF WELLS AND SPRINGS

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

FEDERAL-STATE COOPERATIVE GROUND-WATER INVESTIGATIONS

PREPARED BY U.S. GEOLOGICAL SURVEY
1971



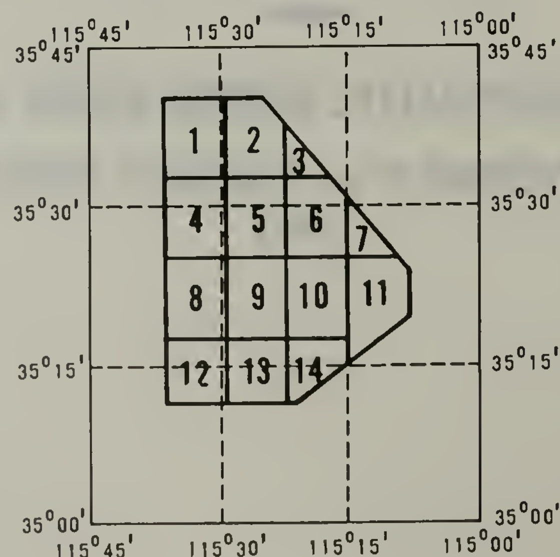
Geology compiled and modified by W.R. Moyle, Jr., from published and unpublished mapping:

1. J.C. Olson, D.R. Shawe, L.C. Pray, and W.N. Sharp
2. D.F. Hewett
3. M.R. Clary
4. Heavy Metals Technology Corp. (unpublished)
5. W.R. Moyle, Jr. (unpublished)

Base from U.S. Geological Survey topographic maps, scale 1:62,500, 1970. Freeway added from State of California, Division of Highways map

INDEX TO TOPOGRAPHIC MAPS AND GEOLOGIC MAPPING

This section consists of explanatory information and 14 page-size maps that show reconnaissance geology and location of wells and springs in the Ivanpah Valley area. The area covered by each individual map is shown below. One composite map, about 31 by 36 inches, is available on request, at the requester's expense, from the district chief, U.S. Geological Survey, Water Resources Division, 855 Oak Grove Avenue, Menlo Park, California 94025.



Geophysical traverses and location of wells and springs by W.R. Moyle, Jr.

MAP SYMBOLS

Geologic contact

Dashed where approximately located

Fault

Dashed where inferred, dotted where concealed, queried where doubtful

Surface-water divide

Geophysical traverse

J1

Industrial well

H1

Domestic or unused well

D1

Dry or destroyed well

KS1

Spring

Long tail indicates length of surface flow in streambed. No spring number indicates no data obtained

LS1

Dry spring

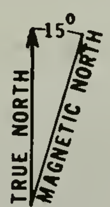
No spring number indicates area of phreatophyte growth for which no spring data was obtained

WELL-NUMBERING SYSTEM

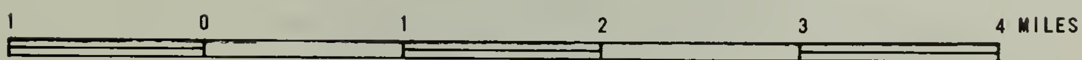
Letter after well indicates position in section thus:

D	C	B	A
E	F	G	H
M	L	K	J
N	P	Q	R

For a complete description of well-numbering system, see text



APPROXIMATE MEAN DECLINATION 1971



CONTOUR INTERVALS 40 AND 80 FEET
DATUM IS MEAN SEA LEVEL

EXPLANATION

UNCONSOLIDATED DEPOSITS

QUATERNARY

Holocene

Qya

Younger alluvium

Unconsolidated sand and gravel, with some silt and clay. Mostly above the regional water table but, where saturated, yields water to wells. Generally of good quality

Qp

Playa deposits

Clay, silt, and fine sand. Yield small quantities of water to wells. Quality ranges from good to poor

Pleistocene

Qoa

Older alluvium

Sand, gravel, and some clay and boulders. Underlies most of Ivanpah Valley beneath younger alluvium. Yields most of the water in Ivanpah Valley. Quality ranges from good to poor with depth

Qof

Older fan deposits

Boulders, gravel, and sand. Near mountains poorly sorted and stratified; in valley better sorting and stratification. Where saturated yield water to wells. Generally of good quality

CONSOLIDATED ROCKS

TERTIARY

Tv

Volcanic rocks

Rhyolite, andesite, basalt, agglomerate, and flow breccia. Yield small quantities of water to wells and springs

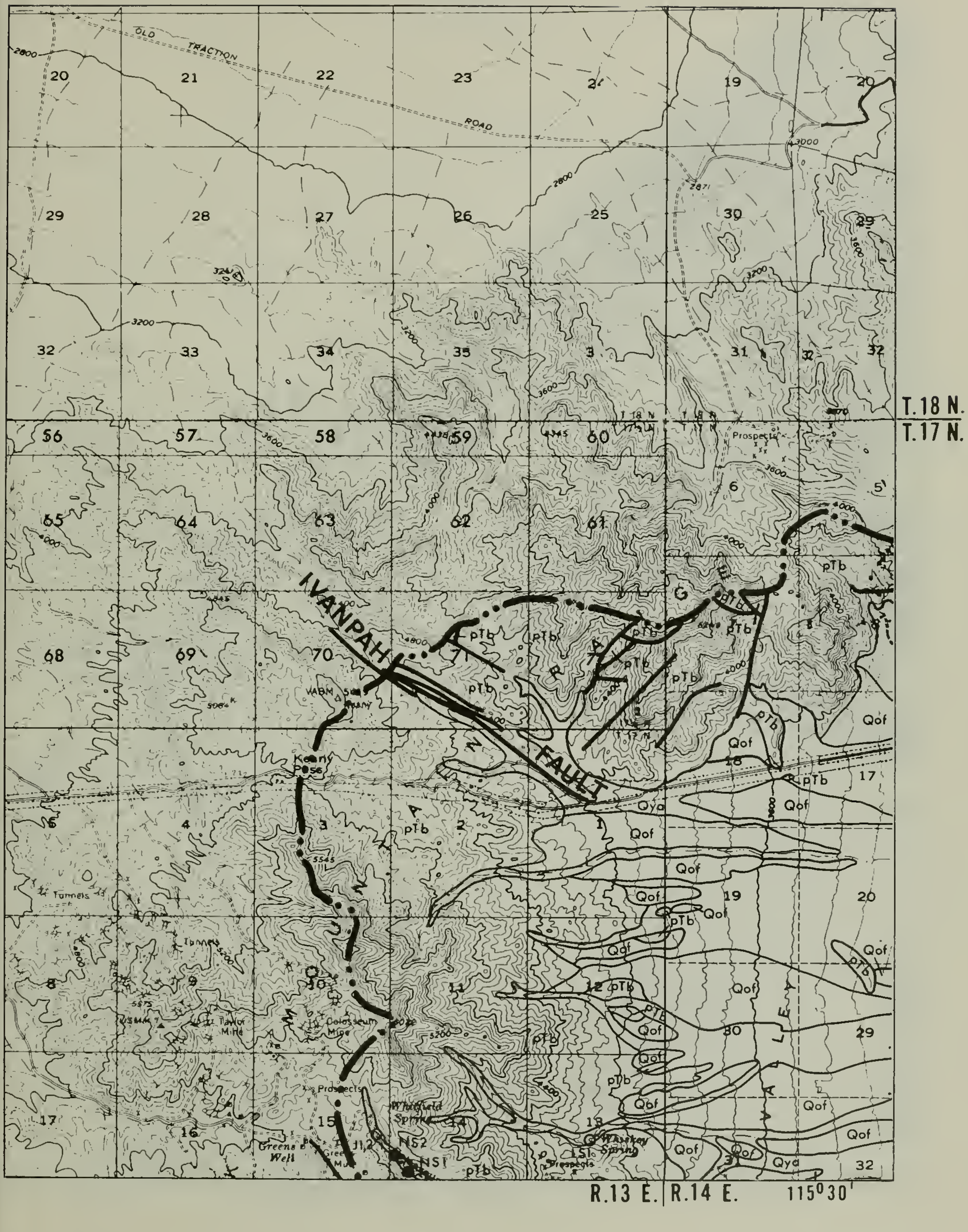
PRE-TERTIARY

pTb

Basement complex

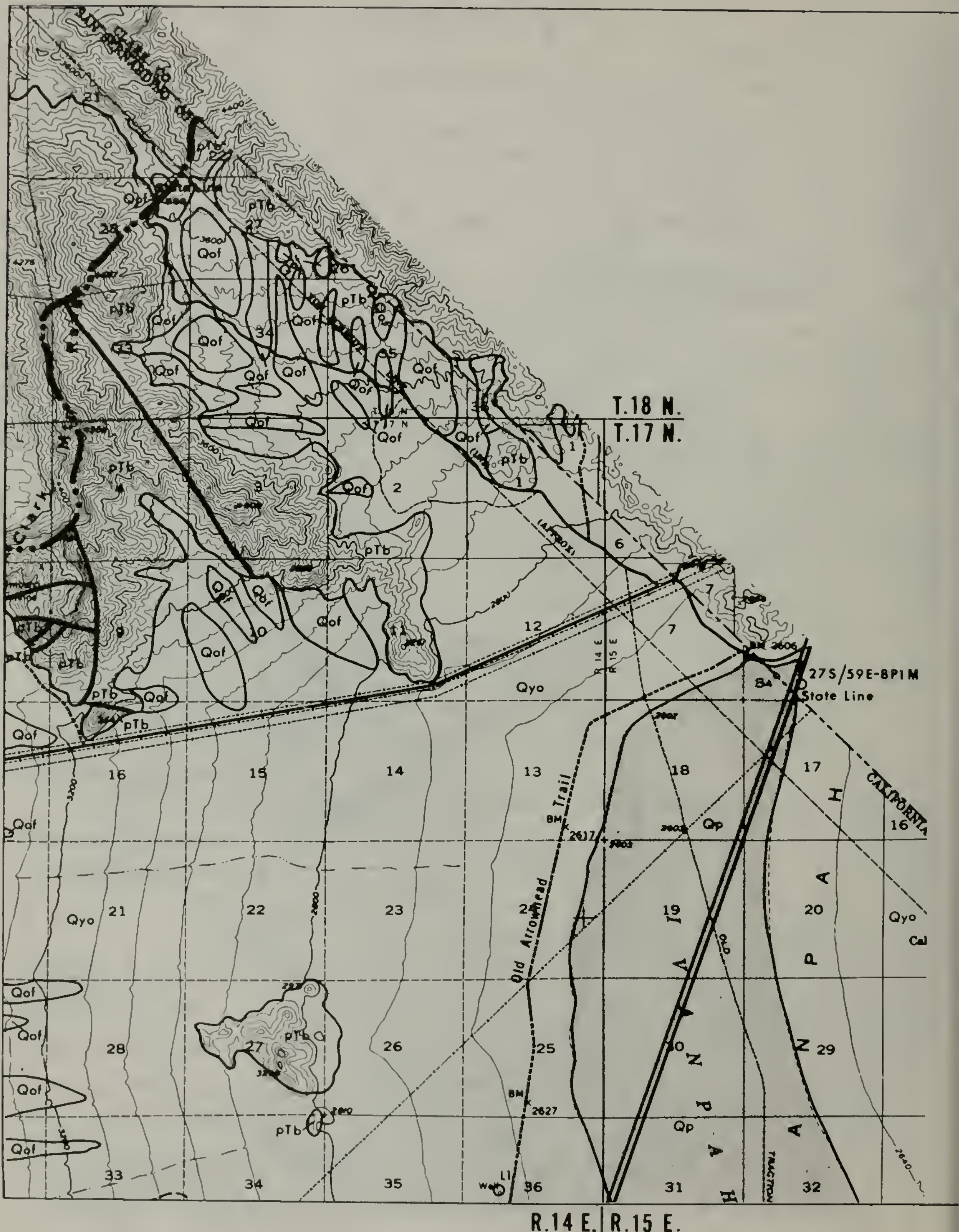
Limestone, dolomite, shale, sandstone, granite gneiss, quartz monzonite, and dacite. Includes the Teutonia Quartz Monzonite, Chinle and Moenkopi Formations, Kaibab Limestone, Supai and Bird Spring Formations, Monte Cristo and Sultan Limestones, Goodsprings Dolomite, Bright Angel Shale, and the Tapeats Sandstone. Yields small quantities of water to wells and springs where rocks are highly fractured; however, the yield is generally less than 10 gallons per minute

MAP 1



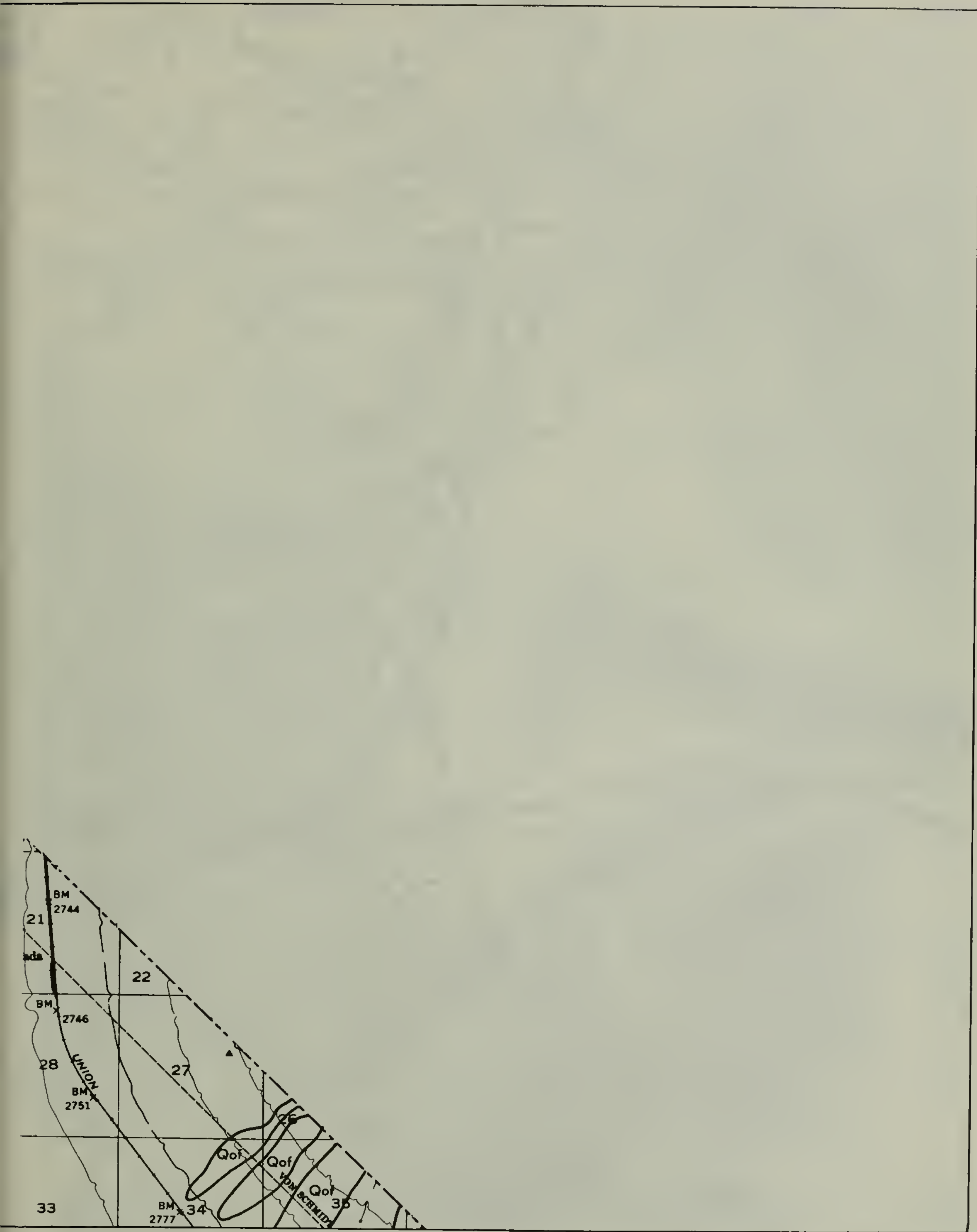
OLD TRACTION ROAD
IVANPAH FAULT
T. 18 N.
T. 17 N.
R. 13 E.
R. 14 E.
115°30'
Qof
pTb
Qya
Kearny Pass
Colosseum Mine
Prospects
Whitfield Spring
Whiskey Spring
Greens Well
Tunnels

MAP 2



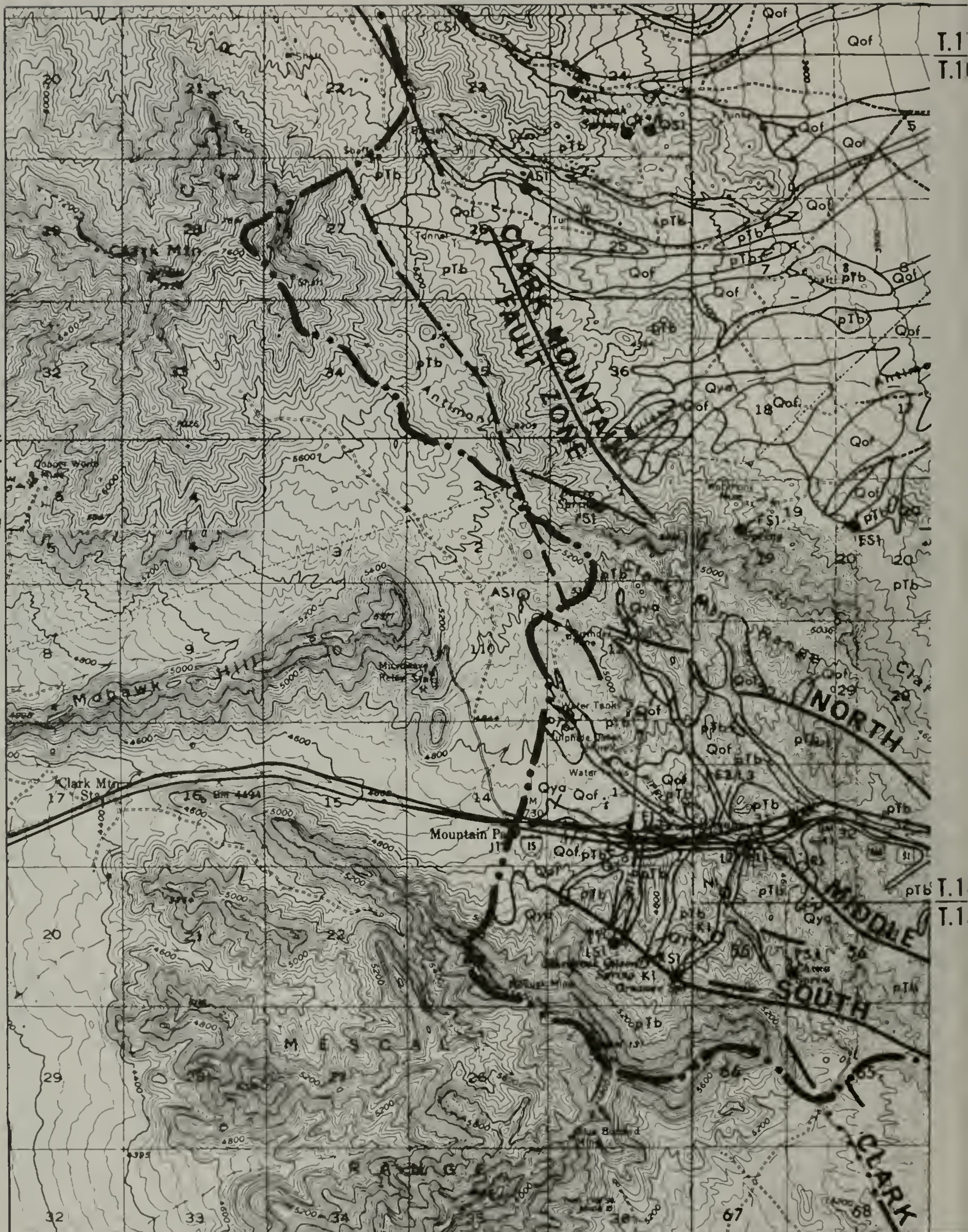
T.18 N.
T.17 N.
R.14 E.
R.15 E.
27S/59E-8P1M
State Line
CALIFORNIA
Old Arrowhead Trail
Clark
Qof
pTb
Qyo
Qp
BM 2617
BM 2627
BM 2606
Well
L1
(APPROX)
OLD
TRACTION
Cal

MAP 3



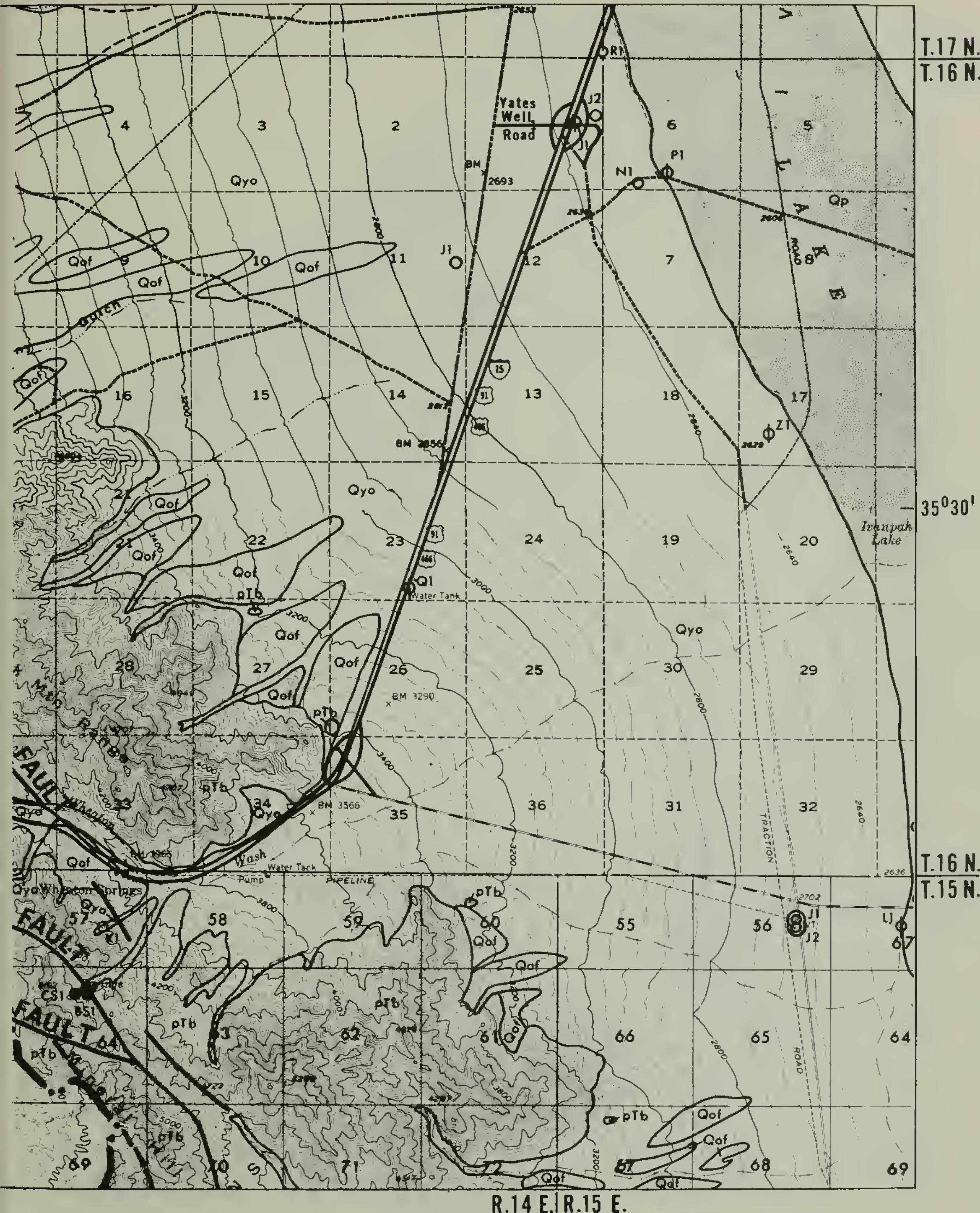
BM
2744
21
22
BM
2746
28
UNION
BM
2751
27
Qof
Qof
Qof
33
BM
2777
34
VON SCHMIDT
35

MAP 4



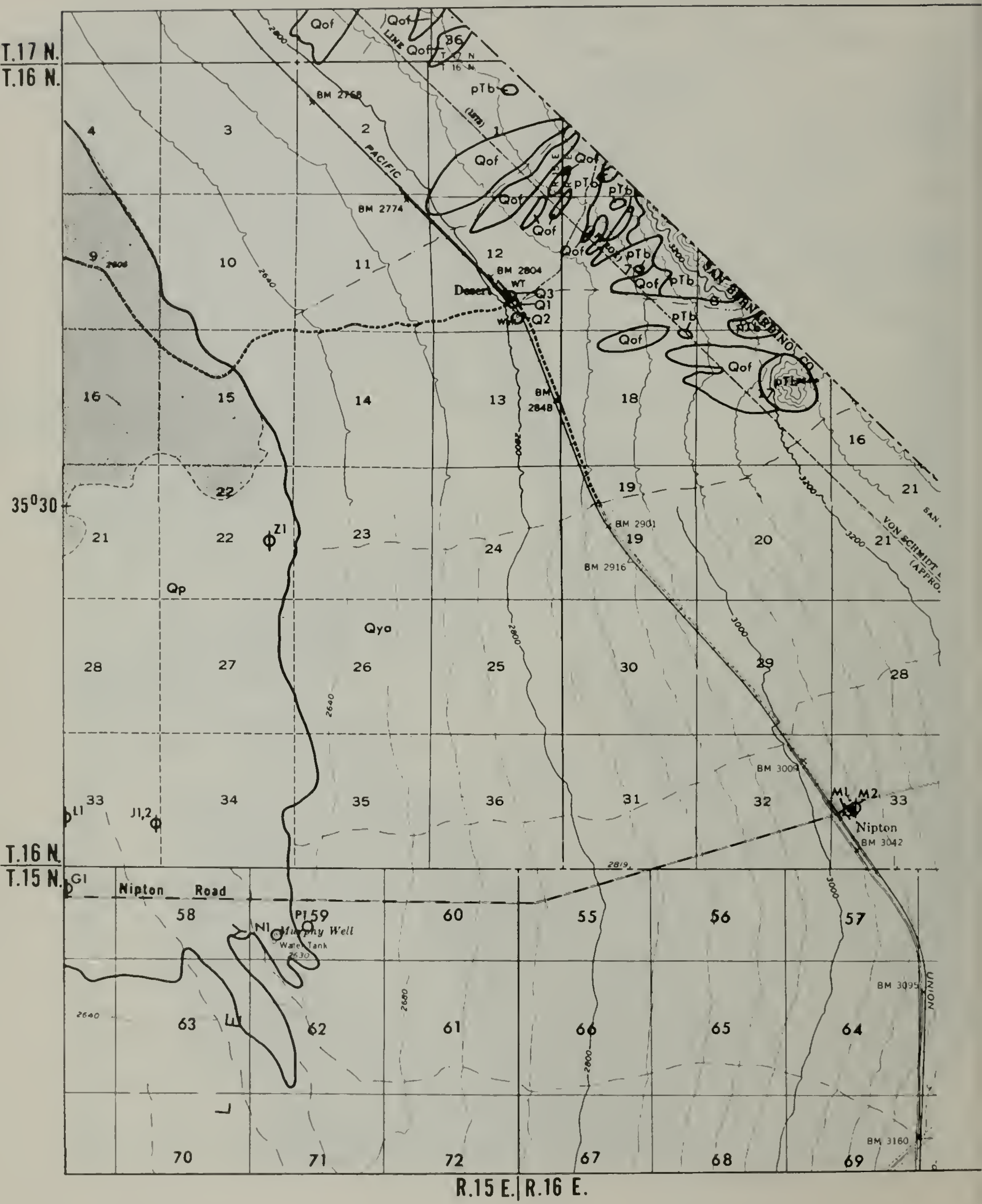
CLARK MOUNTAIN FAULT ZONE
NORTH
MIDDLE
SOUTH
CLARK
Clark Mtn
Antimony
Mohawk Hill
Mountain Pass
M E S C A L
R A N G E
Clark Mtn Sta
Water Tank
T.17 N.
T.16 N.
35°30'
R.13 E.
R.14 E.
115°30'

MAP 5



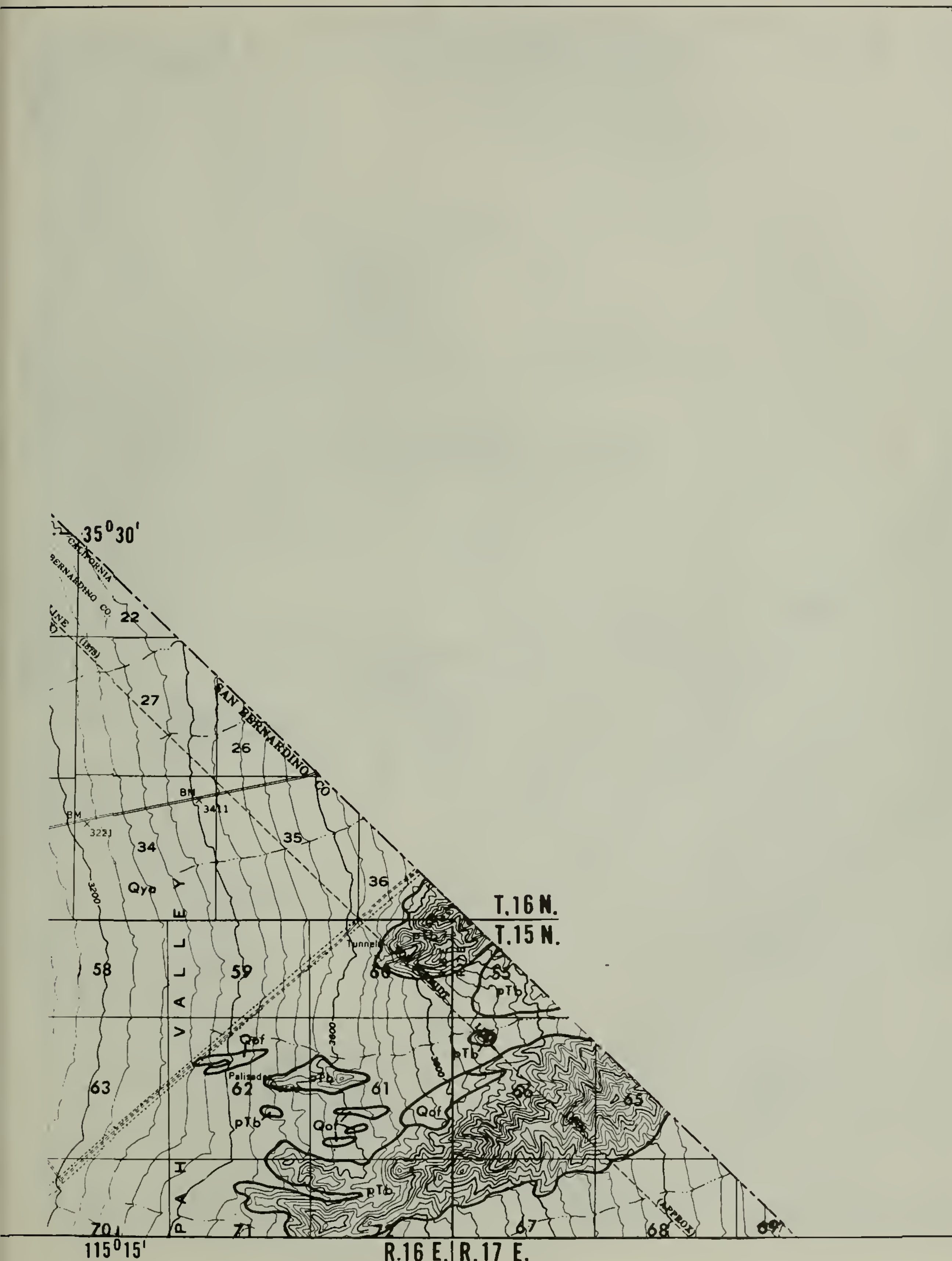
T.17 N.
T.16 N.
T.16 N.
T.15 N.
R.14 E.
R.15 E.
35°30'
Yates Well Road
Ivanpah Lake
Wheaton Springs
Water Tank
Pump
PIPELINE
TRACTION
ROAD
FAULT
BM 2693
BM 2656
BM 3290
BM 3566
Qyo
Qof
Qp
pTb

MAP 6

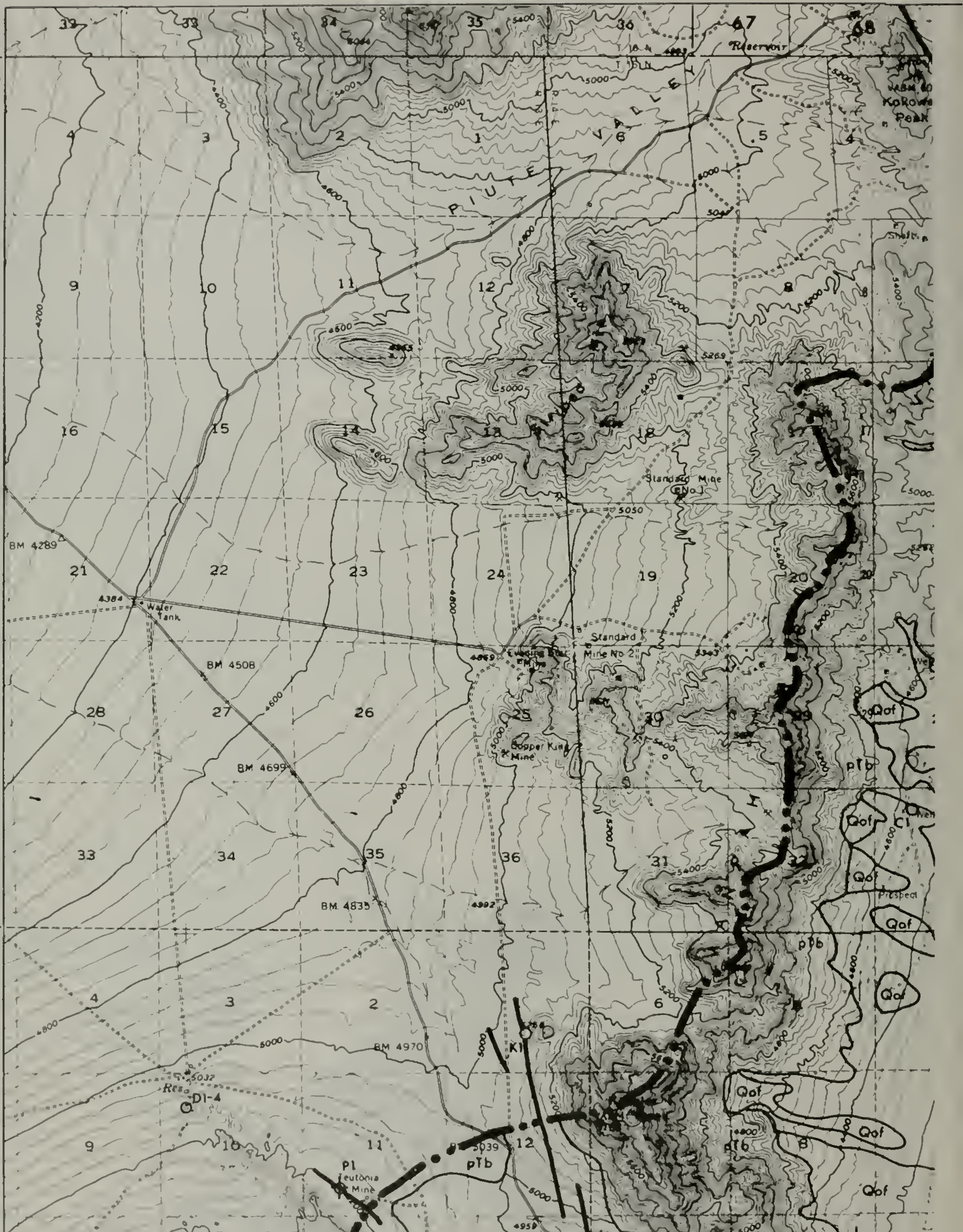


T.17 N.
T.16 N.
T.15 N.
35°30
R.15 E.
R.16 E.
Qof
pTb
Qp
Qya
BM 2768
BM 2774
BM 2804
BM 2848
BM 2901
BM 2916
BM 3009
BM 3042
BM 3095
BM 3160
PACIFIC
LINE
UNION
SAN BERNARDINO CO.
VON SCHMIDT
(APPRO.
Desert
WT
Q1
Q2
Q3
Z1
L1
J1,2
G1
M1
M2
N1
P1
Nipton
Nipton Road
Murphy Well
Water Tank
2630
2640
2680
2800
3000
3200

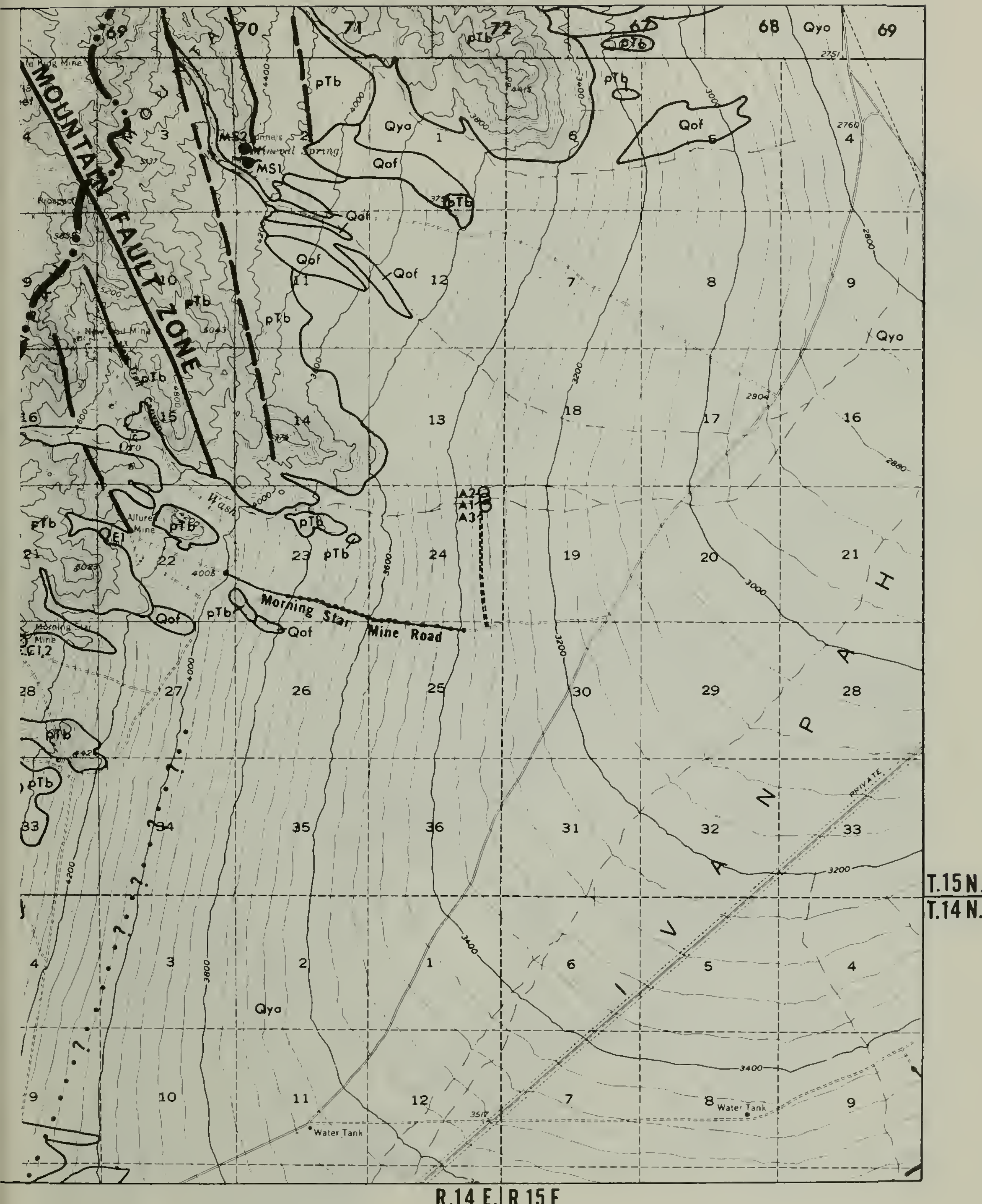
MAP 7


35°30'
CALIFORNIA
SAN BERNARDINO CO.
SAN BERNARDINO CO.
22
27
26
34
35
36
Qyo
T.16 N.
T.15 N.
58
59
60
Tunnel
pTb
VALLEY
PAH
Qof
Palisade
62
61
63
65
pTb
70
71
72
67
68
69
115°15'
R.16 E.
R.17 E.

MAP 8

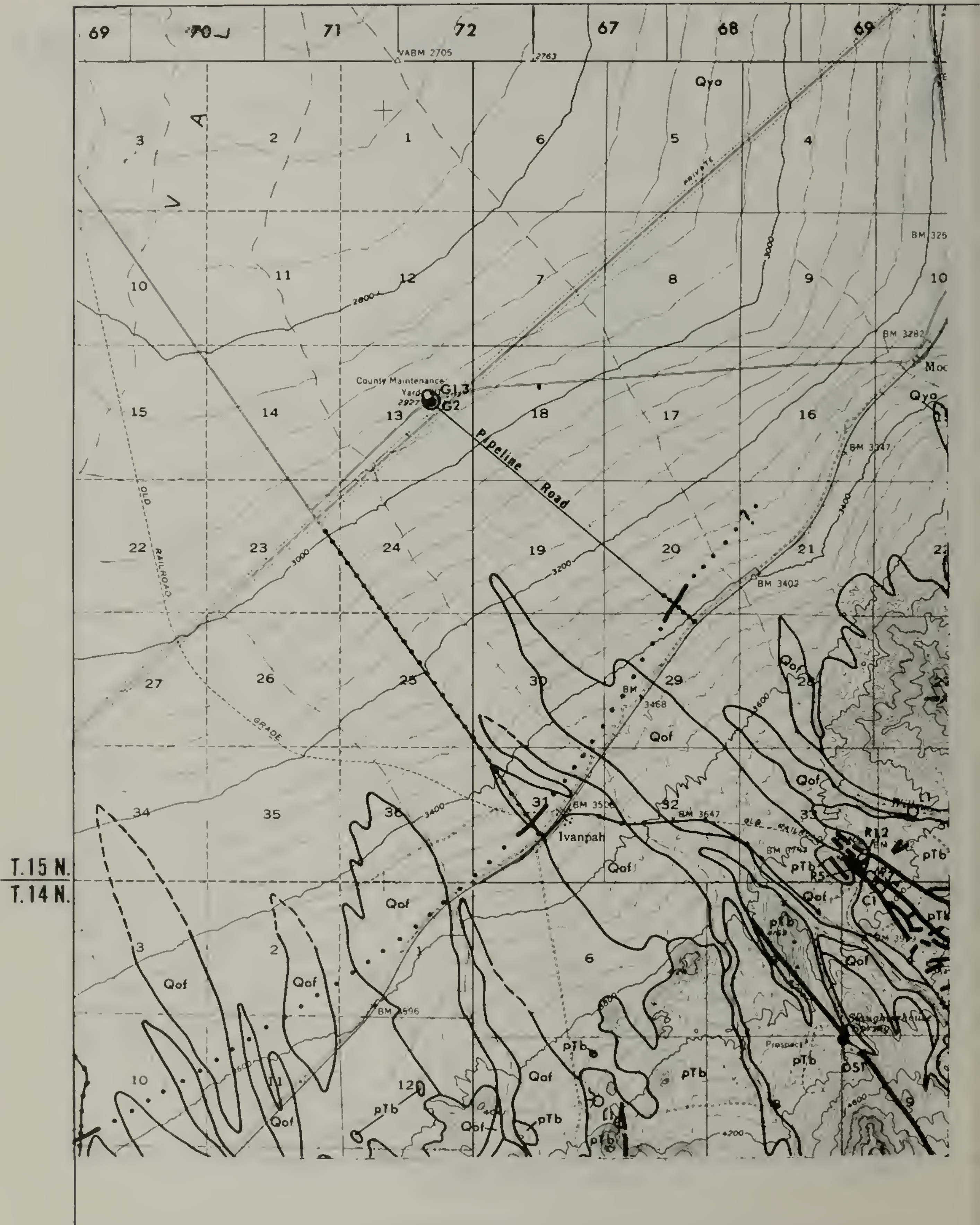

T.16 N.
T.15 N.
T.15 N.
T.14 N.
R.13 E. | R.14 E.
115° 30'
PIUTE VALLEY
Reservoir
Kokoweef Peak
Standard Mine No. 1
Standard Mine No. 2
Copper King Mine
Water Tank
BM 4289
BM 4508
BM 4699
BM 4835
BM 4970
Teutonia Mine
Prospect
Qof
pTb
D1-4
K1
P1

MAP 9



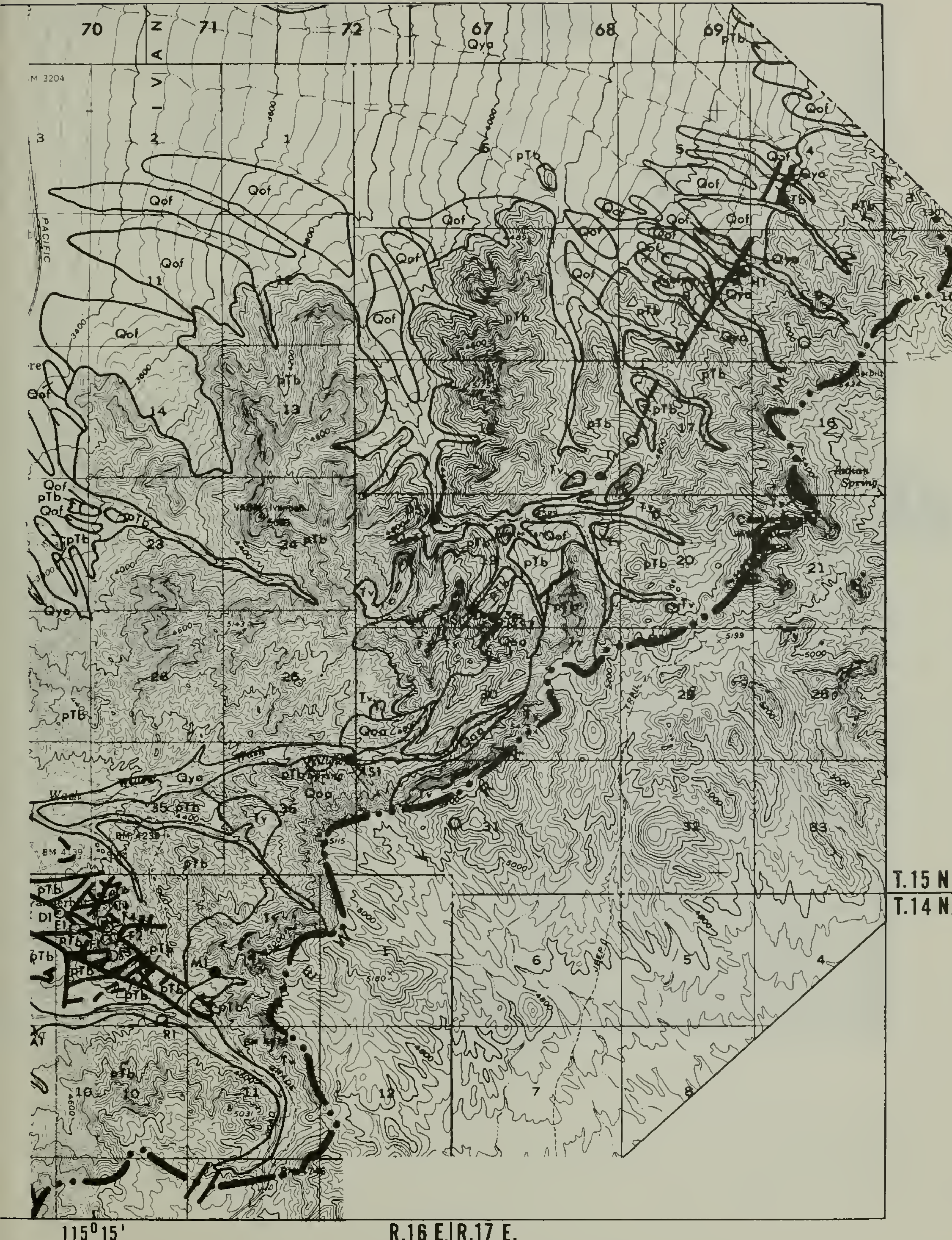
MOUNTAIN FAULT ZONE
Mineral Spring
MS2
MS1
Allure Mine
Morning Star Mine
Morning Star Mine Road
Water Tank
Water Tank
A1
A2
A3
C1,2
IVANPAH
pTb
Qyo
Qof
PRIVATE
T.15 N.
T.14 N.
R.14 E.
R.15 E.

MAP 10



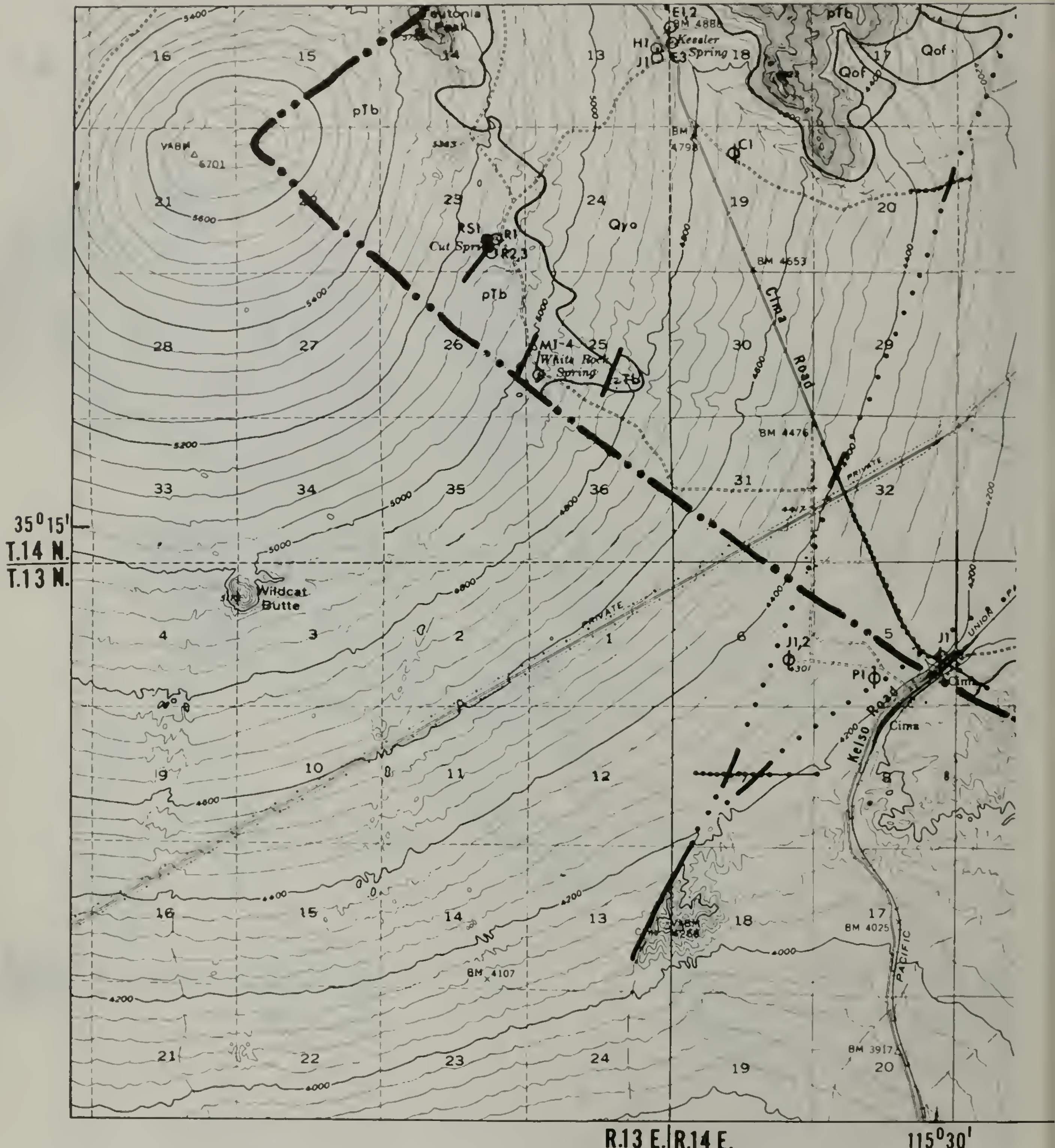
T.15 N.
T.14 N.
R.15 E. | R.16 E.
Pipeline Road
County Maintenance Yard
Ivanpah
OLD RAILROAD GRADE
Qyo
Qof
pTb

MAP 11

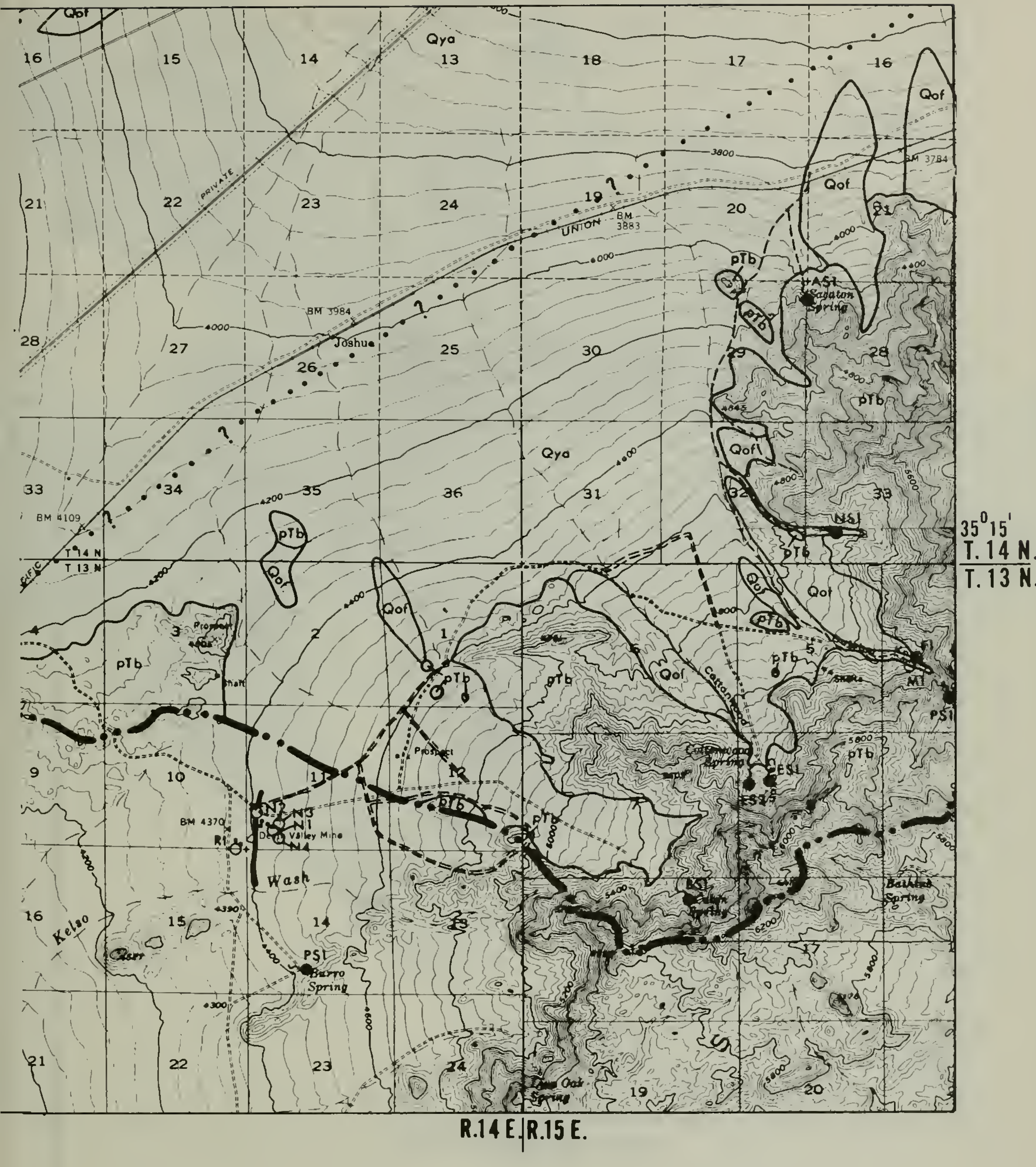


70
71
72
67
68
69
Qya
Qof
pTb
Ty
Qoa
Indian Spring
T.15 N.
T.14 N.
115°15'
R.16 E.|R.17 E.

MAP 12


Teutonia Peak
Kessler Spring
Cut Spring
White Rock Spring
Wildcat Butte
Cima Road
Kelso Road
Cima
PRIVATE
UNION PACIFIC
E1,2
H1
J1
E3
BM 4888
BM 4798
BM 4653
BM 4476
BM 4107
BM 4025
BM 3917
VABM 6701
VABM
C1
RS1
R1
R2,3
MI-4
J1,2
P1
pTb
Qyo
Qof
5400
5600
5200
5000
4800
4600
4400
4200
4000
35°15'
T.14 N.
T.13 N.
R.13 E.
R.14 E.
115°30'

MAP 13


Qya
Qof
pTb
PRIVATE
UNION
BM 3883
BM 3984
BM 3784
BM 4109
BM 4370
Joshua
Saratoga Spring
Cottonwood Spring
Death Valley Mine
Kelso
Wash
Barro Spring
Bathtub Spring
Prospect
T 14 N
T 13 N
35°15'
T. 14 N.
T. 13 N.
R.14 E.
R.15 E.

MAP 14

35°15'
T.14 N.
T.13 N.
R.15 E. | R.16 E.
NEW YORK MOUNTAINS
Pinto Valley
Qof
Qyo
pTb
Fourth of July
Canyon